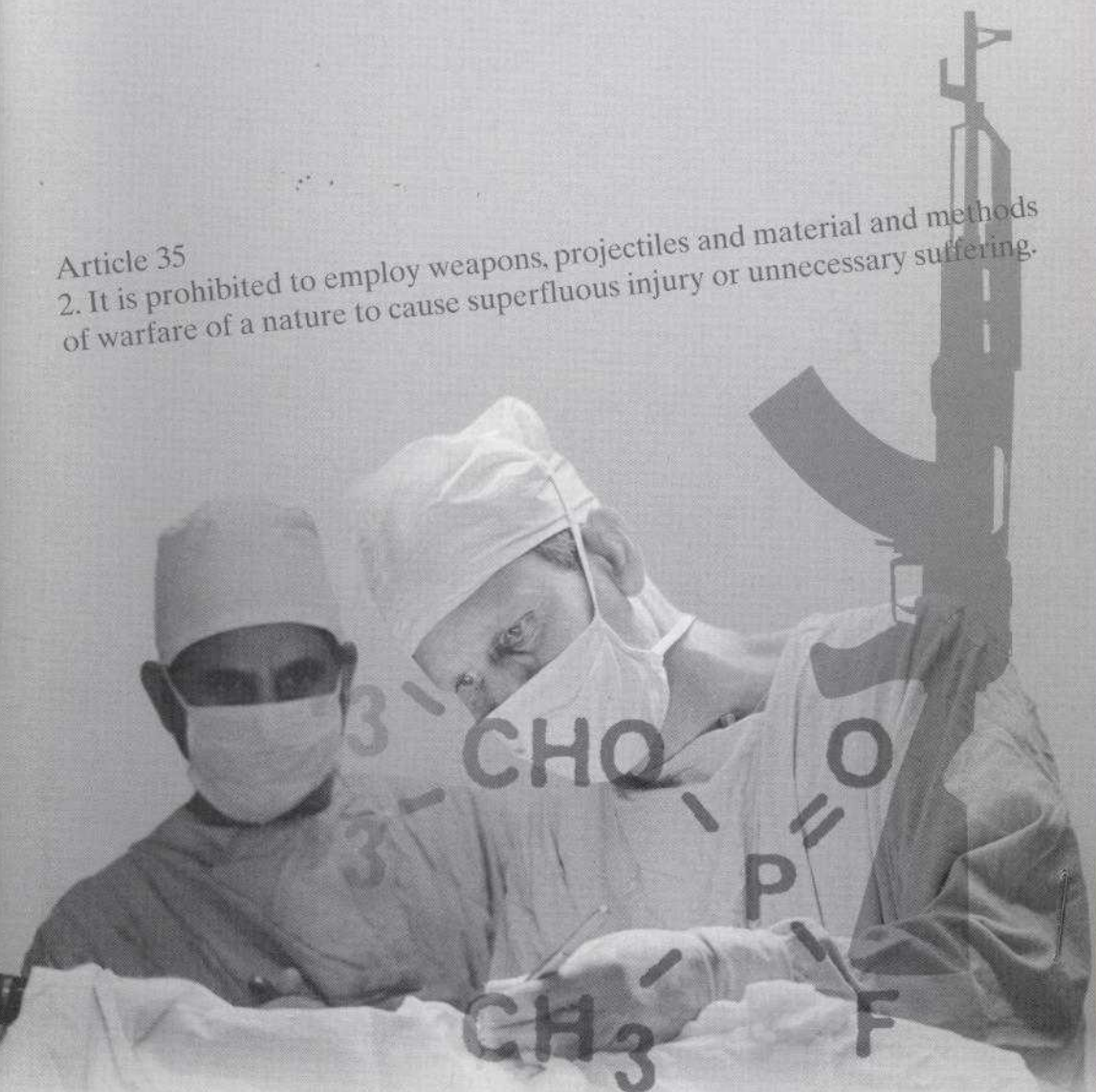


THE **SI_rUS** PROJECT

Towards a determination of which weapons cause
"superfluous injury or unnecessary suffering"

Article 35

2. It is prohibited to employ weapons, projectiles and material and methods
of warfare of a nature to cause superfluous injury or unnecessary suffering.



INTERNATIONAL COMMITTEE OF THE RED CROSS

THE SIrUS PROJECT

Towards a determination
of which weapons cause
“superfluous injury or unnecessary suffering”

Edited by
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Editor's note

The importance of defining in objective terms which weapons are inherently "abhorrent" and weapons which cause "superfluous injury or unnecessary suffering" was one of the major findings of a symposium entitled *The medical profession and the effects of weapons* organized by the International Committee of the Red Cross (ICRC) in Montreux, Switzerland, in March 1996. At this symposium I presented a paper which has since been published: *The effects of weapons: defining superfluous injury and unnecessary suffering*, *Medicine and Global Survival* 1996;3:A1. There has been an extraordinary response to this paper from doctors, medical organizations, lawyers, journalists and even politicians: "This permits doctors to get a handle on weaponry issues in a professional way"; "It's obvious really"; "It's about time the ICRC did this" are just some of comments that I have received. It is this response which has convinced me that the concepts and therefore the criteria presented here are worth promoting within professional circles. I am also convinced that the criteria which are the heart of this document represent the opinion of any reasonable person. The document is not "anti" anything other than the extraordinary and incomprehensible human urge to find more and more sophisticated ways of killing and wounding members of our own species. In particular, it is not anti-military. I believe that promotion of these criteria is in the interests of the military as well; many military people agree and have given sound advice. The SIrUS Project simply aims to place on an objective and comprehensible basis what is already obvious: that the effects on human beings of weapons commonly used by armies now are bad enough and that, if possible, anything worse should be prevented.

Many experts in the fields of weapons, medicine, law and communications have contributed to this final document. It could not have been prepared without such interdisciplinary input. I am indebted to all participants in the SIrUS project.

The data presented as the basis of the proposal are supported by statistical analysis where appropriate. However, how far to take such analysis has been the subject of discussion. The data come from the largest existing database of war-wounded and some trends are so obvious that to subject them to a rigor-

ous statistical analysis would not add to the overall message and might even serve to confuse the reader not familiar with biomedical statistics. I would like to thank Professor Harry Shannon of the Department of Clinical Epidemiology and Biostatistics at McMaster University, Ontario, Canada, for his advice in this respect.

My thanks also go to the head nurses and medical administrators in ICRC hospitals who have helped to collect the data used in the study, to Irène Deslarzes who has handled the administration of the SIRUS Project, to Jürg Zwygart who, as always, has given invaluable help with handling of the ICRC wound database and to both Louise Doswald-Beck and Peter Herby for their guidance on the legal aspects.

Robin M. Coupland

1. Summary

An important legal concept in laws and treaties relating to the conduct of war is that a weapon should not cause “superfluous injury or unnecessary suffering” beyond the military advantage of the user. There has never been an objective means of determining what constitutes “superfluous injury or unnecessary suffering”; some weapons have been deemed “abhorrent” or “inhuman” but exactly what these terms mean has not been defined either.

The twentieth century has seen enormous human suffering caused by weapons and there is no sign of any decrease. This suffering results from a combination of factors dependent on the design of weapons and factors which are user-dependent. Any use of any weapon against human beings carries an intent to cause bodily harm. Understanding and quantification of that bodily harm can help to limit more effectively the suffering caused by weapons both current and future. In relation to policy and law, considering the real effects that weapons have on human beings before the weapons’ nature or technology is logical, but at the same time is a reversal of current thinking.

Conventional weapons – for which there is no formal definition – utilize projectiles or (non-nuclear) explosions and, as a function of their design, inflict physical injury by imparting kinetic energy but not foreseeably to a specific part of the body. Treatment requirements for such injury are well defined. The ICRC has a database containing information on 26,636 war-wounded admitted to hospital. This database has been analysed to measure the collective effects of different conventional weapons, i.e., the effects measured as a proportion of all people injured by a certain type of weapon. The parameters whereby these collective effects are measured include: the proportion of large wounds; mortality; the relative proportion of central and limb injuries; the duration of hospital stay; the number of operations required; the requirement for blood transfusion; and the extent of severe and permanent disability in the survivors. The data relating to “point-detonating” anti-personnel mines show how the measured effects represent the foreseeable effects resulting from their design; these effects distinguish them from other conventional weapons. (In this document, therefore, the term “the effects of conventional weapons” does not include the effects of anti-personnel mines.)

By collating these data with data from military publications, certain effects of conventional weapons have been quantified and are used as a determination of what is *not* “superfluous injury or unnecessary suffering”. A clear and objective distinction is then drawn between the effects of conventional weapons and the effects of all other weapons; this distinction can be expressed in terms of four criteria. The SIRUS Project comprises a group of experts who have worked to define the four criteria and who propose them as a means of determining what constitutes “superfluous injury and unnecessary suffering”.

The proposal is that what constitutes “superfluous injury and unnecessary suffering” be determined by design-dependent, foreseeable effects of weapons when they are used against human beings and cause:

- specific disease, specific abnormal physiological state, specific abnormal psychological state, specific and permanent disability or specific disfigurement (*Criterion 1*);
or
- field mortality of more than 25% or hospital mortality of more than 5% (*Criterion 2*);
or
- Grade 3 wounds as measured by the Red Cross wound classification (*Criterion 3*);
or
- effects for which there is no well-recognized and proven treatment (*Criterion 4*).

One or more of these criteria apply to all weapons which have already been prohibited. Blinding as a method of warfare, “point-detonating” anti-personnel mines and the possible effects of new weapons are examined with these criteria in mind.

Endorsement of the SIRUS Project will have two major implications. First, it will give recognition to the distinction between the effects of conventional weapons and the effects of other weapons; second, it will promote the criteria as an instrument for determining the meaning of “superfluous injury or unnecessary suffering” in the context of law. Endorsement may also provide an objective and precise means of substantiating the public notion of “abhorrent” or “inhuman” weapons.

The SIRUS Project does not propose any new laws. It is not intended as a substitute for arms control and disarmament negotiations; but if endorsed by a significant body of professional opinion it may act as a supplement to those processes.

2. Endorsement of the SIrUS Project

To endorse the SIrUS Project, an individual or organization must write to:

The SIrUS Project,
Health Operations Division,
International Committee of the Red Cross,
19, Avenue de la Paix,
CH-1202 Geneva,
Switzerland.
Fax. +41 22 733 9674.

The communication should incorporate the phrase “I/We/....[Organization] recognize(s) the distinction between the effects of conventional weapons and the effects of other weapons and believe that the criteria set out in the SIrUS Project should be used to determine which weapons cause ‘superfluous injury or unnecessary suffering’”.

3. Weapons, law, injury and suffering

3.1 Weapons: a health issue?

Weapons^a are, by their design, a health issue.^{1,2} This was recognized at the Montreux Symposium in March 1996³ and by the General Assembly of the World Medical Association in October 1996 (Appendix 1). The fact that the medical profession has responsibilities in relation to this health issue was also recognized at both these meetings. These responsibilities range from the gathering of data about the effects of weapons on health,^b thus making the subject objective and understandable, to advocating limits on means of warfare by invoking international humanitarian law and to educating governments, the public and the military about the effects of weapons.

Examination of the effects of weapons on health clarifies legal considerations relating to technology and use of weapons. To limit more effectively the human suffering caused by weapons both current and future, the nature of that human suffering must be understood and quantified. It has been pointed out that objective criteria for measuring suffering would provide a useful tool for lawyers.^{3,4} It has also been noted that, in relation to chemical and biological weapons, there is no objective definition of what makes any particular weapon “abhorrent”,³ although this has not prevented the signing of treaties prohibiting the production and use of these weapons.

3.2 An important distinction: design and use of weapons

When a weapon is used against human beings the factors that determine its effects on health relate to both the design of the weapon and the way it is used. The nature of the injury caused is closely related to the design of the weapon. How many people are injured and who is injured are determined largely by the

^aThe *Oxford English Dictionary* defines a weapon as a “material thing designed or used or usable as an instrument for inflicting bodily harm”.

^bThe *World Health Organization* definition of health is “a state of complete physical, mental and social well-being”.

use of the weapon. Which part of the body is injured may relate to either the design of the weapon or its use. A modern rifle may be used to inflict bullet wounds, each wound representing the deposit of energy of up to 2,500 joules to the human body;⁵ this wounding capacity is the foreseeable effect resulting from the design of the weapon. When such bullets are fired indiscriminately into a crowd or aimed by a sniper at the head of specific individuals, factors relating to use come into play which determine who is injured, their mortality and, for example, the proportion of wounded with limb injuries. By contrast, a “point-detonating” (buried) anti-personnel mine, when triggered by foot pressure, causes traumatic amputation of the foot or leg – a foreseeable effect resulting from the design; user-dependent factors determine, for example, the number and category of people injured. Retinal haemorrhage from a blinding laser weapon is obviously a design-dependent effect. The distinction between design-dependent effects and user-dependent effects is central to this document, which focuses exclusively on the design-dependent, foreseeable effects of weapons.

An examination of the design-dependent, foreseeable effects of weapons must include the question as to whether a weapon can be inherently indiscriminate in its effects. A weapon which injures combatants and non-combatants alike usually does so as a result of user-dependent factors. However, indiscriminate effect may be design-dependent;^a a topical example being anti-personnel mines.⁶⁻⁹ This aspect of the design of weapons is not examined further here. There are legal instruments to limit the indiscriminate *use* of weapons; the same instruments also cover weapons, which *as a function of their design*, are indiscriminate in their effects.

3.3 Weapon design and international law

The concept that States’ right to choose methods and means of warfare is not unlimited has been generally recognized in treaties and custom for centuries. The most important treaty reaffirming the concept is the Hague Regulations of 1907; this rule was recognized as customary^b by the Nuremberg Tribunal; more recently, the International Court of Justice recognized its fundamental customary nature.¹⁰ The most recent treaty to repeat the rule is 1977 Additional Protocol I to the Geneva Conventions of 1949;¹¹ 147 States are party to this Protocol (Appendix 2).

^aA weapon which is inherently indiscriminate in its effects is one which affects combatants and non-combatants without distinction; i.e., even when aimed at or used for a military objective, it will affect civilians in a way that the aimer or user cannot control.

^bThis is defined as general practice accepted as law.

These treaties and others enshrine the concept that any weapon system should not be of a nature to inflict “superfluous injury or unnecessary suffering” beyond the military purposes of the user and should not render death inevitable.^a Whether the effects of a weapon might constitute “superfluous injury or unnecessary suffering” on the part of the victim have, up to now, remained within the realm of emotional reaction or philosophical argument.

The first international treaty relating to the design of weapons was the St Petersburg Declaration of 1868 (Appendix 3) which, on a proposal made by the Russian Tsar, banned bullets which explode on impact with the human body. Similar treaties were the Hague Declaration of 1899 (Appendix 4), which banned the use of dum-dum bullets, the Geneva Protocol of 1925 (Appendix 5), which banned the use of chemical and biological weapons, the Biological Weapons Convention of 1972 and the Chemical Weapons Convention of 1993. (The use of poison or poisoned weapons has been banned by customary law for centuries.) Adoption of these treaties was not based on an objective analysis of the suffering caused by the weapons concerned; such means of warfare were simply deemed “abhorrent” or “inhuman”. It is important to note that these notions originated with and were promoted by politicians and senior military figures out of concern for the effects that such weapons might have on their troops.

Applying the principles of these treaties to existing weapons is difficult; applying them to weapons under development is even more difficult. As weapon systems being developed for potential military use have differing effects on the human body and may not inflict injury by physical means (transfer of kinetic energy), it is essential that some yardstick of injury and suffering be created against which the effect of any weapon can be measured.

Another pertinent element of existing law is the Martens clause. This originated in the first Hague Peace Conference in 1899, was repeated at the second Peace Conference in 1907 and has been carried forward into Protocol I additional to the 1949 Geneva Conventions. It states that civilians and combatants remain “under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from

^a*This concept is to be found in the preamble to the St Petersburg Declaration of 1868, but was not formulated until 1899 in the Regulations Respecting the Laws and Customs of War on Land annexed to the Hague Convention. In the English translation of these Regulations, the expression “maux superflus” was translated by “superfluous injury”; in the 1907 revised version this was replaced by the term “unnecessary suffering”. Since 1977 “superfluous injury or unnecessary suffering” has been generally adopted as a more appropriate translation.*

the dictates of public conscience". That the Martens clause now constitutes an element of customary international humanitarian law has been recognized in the Advisory Opinion of the International Court of Justice on the "Legality of the threat or use of nuclear weapons" handed down on 8 July 1996.¹⁰ In addition, the extent to which policy-makers are influenced by strong public opinion on any issue is now fully recognized. The effect on governments of the publicity campaigns pursuing a ban on anti-personnel mines is evidence of this.

3.4 Health professionals, weapons and the law

Legislation on many health-related issues originates with the collection of data that make the relevant concerns understandable and objective; controls on cigarette advertising and the compulsory wearing of seat belts are examples. In the same way, determination of which effects of weapons constitute "superfluous injury or unnecessary suffering" requires input of health-related data. Injury and suffering are health issues and so health professionals are in a position to help lawyers, governments and the public to decide, on the basis of objective criteria, what is superfluous or unnecessary. Using medical data and arguments to support existing law is a responsibility of the medical profession; this has been recognized by the World Medical Association (Appendix 2). Another responsibility of the medical profession is to educate the public about health issues (see Section 5.6).

The effects of weapons on health should be the basis for legal, ethical, technical and political decisions with respect to weapons; in other words, what weapons really do to human beings should be the lowest common denominator for different professional concerns. This can be demonstrated by examining the focus on bullet construction as a means of limiting human damage in warfare. Dum-dum bullets, which have an exposed lead tip and so splay open on impact with the body, were prohibited in 1899 on moral grounds because of the large wounds they caused. However, technology can circumvent the law by, for example, giving "legal" bullets a higher velocity and thus the potential to produce the same large wounds. This century, many wound ballistic studies have been performed which have fuelled legal debate about bullet construction. If the effects on health of small arms, which are measurable by a clinical wound classification¹²⁻²⁰ or can be modelled in a laboratory,²¹ were used as the basis for considering bodily harm, the international law governing means and methods of warfare would not get bogged down in technical specifications for bullet construction; scientist, designer, lawyer, soldier and surgeon would have a common point of understanding. A recent and significant legal development is the new Protocol, added in 1995 to the 1980 UN Convention on Certain

Conventional Weapons (Appendix 6), which prohibits the use of laser weapons designed specifically to cause blindness.^{22,23} This is important because it applies to a weapon before that weapon's effects have been observed on the battlefield. However, other "optical munitions" have been developed which could be used specifically to blind people in war.^{24,25} Although these examples show how politicians agree that there should be a limit to the means and methods of warfare, the prohibition of dum-dum bullets and blinding laser weapons exposes a fundamental defect in this part of international law. In both cases, it is the technology of a weapon that has been prohibited and not its foreseeable effect on human beings. Bullets causing large wounds should have been prohibited in 1899; intentional blinding as a method of warfare should have been prohibited in 1995. In brief, the objective of international law in relation to the design of weapons is to prevent certain adverse or excessive effects on health; prohibition of the use of certain materials or technologies may not suffice.

3.5 The SIrUS Project: towards a determination of which weapons cause "superfluous injury or unnecessary suffering"

The principal element of the SIrUS Project is the idea that the effect of a weapon should be considered before its nature, type or technology; this is a reversal of current thinking. The project has involved a group of experts in the areas of weapons, medicine, law and communications, whose work proceeded in three stages. First, they collated data relating to the effects of conventional weapons;^a second, they used this data as a baseline for the consideration of the effects of all weapons; third, they defined four criteria which make an objective distinction between what constitutes and what does not constitute the effects of conventional weapons.^b They now propose these criteria as a basis for determining which effects of weapons constitute "superfluous injury or unnecessary suffering" and request endorsement of this proposal by professional and academic bodies.

States have an obligation to determine the legality of any new means and method of warfare they are procuring or developing (Appendix 2). The objective of the SIrUS Project is to facilitate such determination without legal wrangling about certain materials or technologies.

^a*There is no formal definition of "conventional weapons"; in this document, the term refers to weapons which are currently in use by armies and which utilize projectiles or (non-nuclear) explosions.*

^b*In this document, the term "effects of conventional weapons" does not include those of "point-detonating" anti-personnel mines.*

4. The effects of conventional weapons: a study

Some readers may wish to pass over the study and go on to section 5 in which the criteria for the SIrUS Project are formulated and discussed.

4.1 Introduction

The effects of projectiles and explosions on individuals can be documented by using the Red Cross wound classification.^{12,13} In a clinical setting, this classification has been used to document the incidence of bullet disruption in armed conflict¹⁴ and the categories of wounds caused in civilians by hand grenades,¹⁵ and to refine the wounds of people injured by fragments or bullets according to structures injured and extent of tissue damage.¹⁵⁻¹⁹ From the score given to any wound its grade, which denotes its size and so reflects energy deposit, can be computed: Grade 1 denotes skin wounds of less than 10 cm without a cavity; Grade 2 denotes skin wounds of less than 10 cm but with a cavity; Grade 3 denotes skin wounds of 10 cm or more with a cavity. It is not possible to establish a precise correlation between grade and energy deposit nor between grade and type of weapon. However, handgun bullets usually inflict Grade 1 wounds and deposit up to 500 joules of energy.⁵ A close-range shotgun wound or a wound from a dum-dum bullet is likely to be of Grade 3 and is associated with deposit of more than 1,500 joules of energy.⁵ Modern assault rifles can inflict all grades of wound, depending on range, bullet construction and length of the wound track in the body. Fragments of shells, bombs, grenades and mortars are capable of inflicting all three grades of wounds, depending on their mass and velocity.

It is also possible to measure the collective effects of weapons by determining, for example, the mortality caused by a weapon system in the field (in military terms: “killed in action”), the proportion of casualties who die after reaching a medical facility (“died of wounds”), hospital mortality, the number of days the survivors stay in hospital, the number of operations they require, the number of units of blood they need during treatment, or the proportion of survivors with a particular residual disability.

The ICRC’s wound database grew out of a simple system of data collection which was originally designed to give an indication of the activities of inde-

pendent ICRC hospitals. Included in the information recorded for each patient is the cause of injury, the time lapse between injury and admission, the wound classification, the region or regions injured, whether the patient has died in hospital, the number of operations, the number of units of blood required, the number of days spent in hospital, and whether the patient was discharged with amputation of one or both lower limbs. This method of data collection was introduced in January 1991. Since then, all war-wounded patients who have been admitted to the ICRC hospitals in Peshawar and Quetta (Pakistan/Afghan border), Kabul (Afghanistan), Khao-I-Dang (Thai/Cambodian border), Butare (Rwanda) and Lokichokio (Kenyan/Sudanese border) have had a data form filled out on their death or discharge from surgical wards as part of the hospital routine. The database currently contains data relating to 26,636 patients, of whom 8,805 (33.1%) were females, males less than 16 years old or males of 50 years or more and hence were unlikely to have been combatants.

There is inevitably an unknown proportion of forms that are not filled out correctly; an enormous effort has been made to reduce this proportion to a minimum. The readiness of surgeons to score wounds according to the Red Cross wound classification is variable. Some patients lie about the cause of their injuries to gain admission to hospital or may not know exactly what injured them. Because of the constraints imposed on the collection of these data under field conditions, their "validity" and "reliability" have not been ascertained by formal independent means.

4.2 Method

The patients' data were analysed by cause of injury. "Fragment" indicates injury from shell, bomb, grenade or mortar. "Bullet" indicates any gunshot wound. "Mine injury" refers to any person admitted as a result of a mine explosion, whether anti-tank or anti-personnel mine. "Burn" indicates burn injury from any cause. "Mine causing amputation" is a subgroup of all the mine-injured but is taken to correspond broadly to those who have stepped on a "point-detonating" anti-personnel mine.⁶

For patients with fragment and bullet wounds and for whom a wound score according to the Red Cross wound classification was recorded, the grades of the first or only wound scored were computed.

Site or sites of injury (head/neck, chest, abdomen, back, pelvis/buttocks, right upper limb, left upper limb, right lower limb and left lower limb) for those admitted to hospital within 24 hours were analysed according to cause of injury.

For those injured by fragments, bullets, burn or mines and who were admitted to hospital within 24 hours, hospital mortality was computed. For the surviving patients of the same group the following were computed: average number of days spent in hospital (this is the number of days to surgical discharge, excluding the portion of stay of those who had to wait in hospital for political or geographical reasons); average number of operations required; proportion of patients transfused, average number of units of blood transfused; total number of lower limbs amputated (this is not given as a proportion of all patients because of the small number who had bilateral lower limb amputation). Those injured by mines and who arrived with traumatic amputation or who subsequently underwent surgical amputation were analysed as a subgroup of all mine injuries. In this part of the study only data from patients who were admitted within 24 hours of injury were analysed, so those who had delayed access to medical care did not influence the results.

4.3 Results

Table 1 shows the proportion of the grades of the first wound scored on the records of 8,295 patients injured by fragments or bullets.

Table 1

	Grade 1	Grade 2	Grade 3
Fragments (shell, bomb, grenade, etc.) (3,157 patients)	1,841 (58.3%)	1,054 (33.4%)	263 (8.3%)
Bullets (5,138 patients)	2,333 (45.4%)	2,296 (44.7%)	509 (9.9%)

The proportion of grades of the first wound scored by the Red Cross wound classification in 8,295 patients injured by fragments and by bullets. The classification and the significance of the grade of the wound is explained in the text.

The 95% Confidence Interval (CI) on the presence of Grade 3 wounds resulting from fragments is 7.3% to 9.3%; that for wounds from bullets is 9.1% to 10.7%.

Table 2 shows hospital mortality according to cause of injury in 8,762 patients who were admitted within 24 hours of injury.

Table 2

Cause of injury	Number of patients	Number died (mortality %)
Fragments	2,926	118 (4.0%)
Bullet	2,706	124 (4.6%)
Burn	102	19 (18.6%)
Mine	3,028	121 (4.0%)
(Mine causing amputation)	890	55 (6.2%)

Mortality in 8,762 patients admitted to independent ICRC hospitals within 24 hours of injury according to cause of injury. "Mine" = all mine-injured patients. "Mine causing amputation" = patients who arrived with a traumatic amputation or who underwent surgical amputation; it is a subgroup of all the mine-injured.

The percentages dying by cause of injury are different ($X^2=51.83$ on 3 d.f., $p<0.001$). The percentages dying from fragments, bullets and mines are not significantly different from each other as shown by partitioning of the chi-square statistic ($X^2=1.50$ on 2 d.f., $p>0.05$), confirming that the overall significance is due to the high proportion dying from burns.

Table 3 shows the regions injured according to wounding agent in 8,660 non-burn patients admitted within 24 hours of injury.

Table 3

	Number of patients	Number of regions injured	Regions injured per patient	Central injuries (% all injuries)	Upper limb injuries (% all injuries)	Lower limb injuries (% all injuries)
Fragments	2,926	5,531	1.9	43.5	23.8	32.6
Bullet	2,706	3,491	1.3	45.2	20.2	34.5
Mine	3,028	7,282	2.4	27.8	27.2	44.9

The number and distribution of wounds in 8,660 patients admitted to independent ICRC hospitals within 24 hours of injury according to cause of injury. "Central injuries" = wounds of the head/neck, chest, abdomen, back, buttocks/pelvis.

The distribution of the sites of injury is very different for the different types of weapons. (Patients frequently had multiple injuries, so the standard chi-square test is not computed due to non-independence of data.) Inspection shows that the proportion of lower limb injuries due to mines was much higher than for the other two types of weapon.

Table 4 shows, for the 8,380 patients surviving to discharge and according to cause of injury: average number of days spent in hospital; average number of operations; proportion of patients transfused; average volume of blood transfused in units; number of lower limbs amputated.

Table 4

	Total survived	Mean days in hospital	Mean number of operations	Proportion transfused (%)	Mean units of blood given	Number of lower limbs amputated
Fragments	2,808	14.3	1.9	14.1	0.4	63
Bullet	2,582	19.1	2.1	15.9	0.5	20
Burn	83	18.8	1.7	8.4	0.3	1
Mine	2,907	22.3	2.8	33.6	1.3	915
(Mine causing amputation	835	32.9	4.0	74.9	3.1	915)

Data from 8,380 war-wounded patients who survived, showing days in hospital, operations per patient, blood transfusion and lower limb amputation. All patients were admitted to independent ICRC hospitals within 24 hours of injury. The number of lower limb amputations is not given as a percentage of all patients because of the few requiring bilateral amputation. "Mines" = all mine-injured patients who survived; "Mine causing amputation" = those mine-injured who survived with either a below-knee amputation, an above-knee amputation or bilateral lower limb amputation.

The percentage of patients receiving transfusion were significantly different across the different causes of injury ($X^2=401.3$ on 3d.f., $p<0.001$). By far the highest proportion was in the mine-injured, the excess being almost wholly due to amputations.

4.4 Discussion

When patients are admitted to an ICRC hospital, their military status is neither ascertained nor recorded. The fact that at least 33% of the patients could be presumed to be "non-combatants" reflects the reality of modern conflicts. There are no means of establishing how many die before reaching hospital.

Table 1 shows that for those patients injured by either fragments or bullets, the proportion with Grade 1 wounds and Grade 2 wounds differs. However, the corresponding proportion with Grade 3 wounds is similar in both cases and is less than 10%. This establishes a baseline for the proportion of large wounds in those who survived to hospital. The majority of bullet wounds seen in ICRC hospitals are caused by the Kalashnikov AK-47.

A review of data from military medical sources, who know the number of fatalities in the field, shows how little mortality has changed since World War II.²⁶⁻²⁸ The proportion of wounded who die in the field varies between 18% and 22%. Likewise, the proportion of all casualties who die after reaching a medical facility varies between about 2.5% and 4.5%.²⁶⁻²⁹ This gives a baseline proportion of deaths among casualties which has been accepted by military and political leaders and lawyers as a consequence of war waged in this period of history. The figures for hospital mortality by cause of injury given in Table 2 are comparable, except for those who suffer burns. As the plight of burn patients in hospital is particularly miserable, this high hospital mortality in ICRC facilities represents a lingering death.

Table 3 shows that the distribution of regions wounded by fragments and by bullets are similar. The higher proportion of lower limb injuries and the lower proportion of central injuries in mine-injured patients reflects the foreseeable effects resulting from the design of these weapons; “point-detonating” anti-personnel mines cause traumatic amputation of the contact foot or leg and fragmentation mines tend to damage the lower limbs.⁶ Table 3 also indicates that, in addition to their predilection for lower limbs, mines injure more regions per wounded person than fragmentation weapons.

“Point-detonating” anti-personnel mines are designed to be triggered by foot pressure and thus cause traumatic amputation of a lower limb (a Grade 3 wound). Table 4 shows that mines are a much greater drain on hospital resources as compared with other conventional weapons, and inflict permanent and severe disability on anyone who survives injury. Days spent in hospital, the number of operations and the requirement for blood transfusion are all greater in this group - a reflection of the volume of severe tissue damage which the surgeon must treat.^{6,30,31} Combining these foreseeable and measurable effects with the fact that ejected fragmentation mines cause 100% mortality among those that trigger them³² not only raises the question of “superfluous injury or unnecessary suffering” in relation to the design of anti-personnel mines³³ but could also support the argument that “point-detonating” anti-personnel mines should be put in a separate category from other conventional weapons *because* of their foreseeable effects on health.

The surgical facilities of the ICRC, as a matter of policy, work with a basic level of technology, non-specialist surgery, and no onward evacuation to other facilities; emphasis is placed on certain basic principles of surgical management.^{34,35} These facilities often give a better standard of care than is available in the countries where war is being fought and may even represent a “best-case” scenario. Hospital mortality differs little from that reported in military publications.²⁶⁻²⁸ In terms of meeting medical and surgical needs for treating explosive and missile wounds these hospitals provide a baseline standard of care. However, the medical facilities required to improve survival in cases of burn injury simply cannot be made accessible to victims of modern wars without enormous input in terms of funds and specialized personnel.

4.5 Conclusions

The study shows some of the foreseeable and measurable effects of conventional weapons on human beings. These effects stem from two important features which distinguish conventional weapons (except “point-detonating” anti-personnel mines) from all others: first, they exert their effects by physical injury to the tissues of the human body; second, excluding user-dependent factors, there is a randomness as to which part of the body is injured. A series of baselines relating to injury and suffering resulting from the effects of conventional weapons, including a baseline of treatment requirements, is established.

The data pertaining to the effects of “point-detonating” anti-personnel mines show how their foreseeable effects differ measurably from those of other conventional weapons and that these different effects can only be design-dependent.

5. A proposal for determination of which weapons cause “superfluous injury or unnecessary suffering”

5.1 A combination of concepts

The proposal for determination of which design-dependent, foreseeable effects of weapons constitute “superfluous injury or unnecessary suffering” assumes that:

- the effect of a weapon resulting from its design rather than the weapon’s nature, type or technology is the primary consideration;
- the effects of all weapons both on individuals and on groups of people are measurable;
- the effects of conventional weapons on health which are well-documented, provide a reference baseline or yardstick for determining the foreseeable effects of all weapons when used against human beings;
- the degree of suffering caused by a weapon is increased if there is no treatment available.

The effect of a weapon on any individual may be described and certain parameters of injury measured; however, these may not reflect the effect on all individuals. The collective effects measured in groups of people wounded by the weapon in question has significance,^{6,15,27,29,36} it reflects more accurately the foreseeable effect of the weapon resulting from its design when in normal use. The study described above demonstrates some of the foreseeable and measurable effects of conventional weapons on both individuals and groups. This is the best index of injury and suffering available and, up to now, neither law nor public opinion in general have wanted to prohibit these weapons because of their design-dependent effects. The basis of the SIrUS Project is the use of data relating to the effects of conventional weapons to determine what is *not* “superfluous injury or unnecessary suffering”. Any other foreseeable effects of weapons would therefore constitute “superfluous injury or unnecessary suffering”.

5.2 The proposal of the SIrUS Project

The proposal is that what constitutes “superfluous injury and unnecessary suffering” be determined by design-dependent, foreseeable effects of weapons when they are used against human beings and cause:

- specific disease, specific abnormal physiological state, specific abnormal psychological state, specific and permanent disability or specific disfigurement (*Criterion 1*);

or

- field mortality of more than 25% or a hospital mortality of more than 5% (*Criterion 2*);

or

- Grade 3 wounds as measured by the Red Cross wound classification (*Criterion 3*);

or

- effects for which there is no well recognized and proven treatment (*Criterion 4*).

The criteria thus combine to form a clear picture of injury and suffering that is *not* the equivalent of the effects of conventional weapons. This is the nucleus of the SIrUS Project.

5.3 Examination of the criteria

Criterion 1 – specific disease, specific abnormal physiological state, specific abnormal psychological state, specific and permanent disability or specific disfigurement

Criterion 1 draws an important distinction between the effects of all other weapons and the effects of conventional weapons (except “point-detonating” anti-personnel mines).

The foreseeable psychological effects of weapons have been stressed.^{3,22} Whilst all weapons produce fear and stress, these reactions are neither specific nor abnormal. Criterion 1 would apply to a weapon designed to disorientate, confuse, induce calm or precipitate seizures or psychosis.^{24,25,37,38} In the same context, the known neuroendocrine response to physical trauma from conventional weapons is part of their effects.^{20,39} The same neuroendocrine response produced by an agent or energy form without physical injury would represent a specific and abnormal physiological response.

Conventional weapons do not generate an absolute necessity for blood transfusion, as shown in the study. Criterion 1 would apply to any weapon which, for example, foreseeably causes gastrointestinal haemorrhage for which a blood transfusion would be needed. The implications of the need for blood transfusion are particularly important; without a reliable and safe blood bank, which is difficult to establish in a war zone, there is a risk of transfusing blood that has not been cross-matched or tested for communicable diseases such as syphilis, hepatitis B and HIV (the virus causing AIDS).³⁰

The need for multiple operations compounds the suffering from the effects of weapons; patients wounded by conventional weapons do not require, on average, more than three operations in a non-specialized surgical facility. Thus a weapon which, for example, causes facial disfigurement as a foreseeable effect would give rise to the need for multiple reconstructive operations in a specialized facility. Criterion 1 would apply, possibly in combination with Criterion 4.

Criterion 2 – field mortality of more than 25% or hospital mortality of more than 5%

The use of weapons whose design renders death inevitable is already prohibited as part of the same legal concept that prohibits those causing “superfluous injury or unnecessary suffering” (Appendix 3). The study shows, for different categories of conventional weapons, how constant the figures are both for field mortality and for later mortality after the wounded person reaches a medical facility.^{26-29,36} The figures for field mortality and hospital mortality must be considered separately because death from a weapon may occur days or weeks after injury, as is the case with burns and as shown in Table 2 of the study. The figures of 25% and 5% for field and hospital mortality respectively are proposed as limits which are on the conservative side of the established baseline.

Criterion 3 – Grade 3 wounds as measured by the Red Cross wound classification

This criterion is needed to apply to weapons which, without targeting a particular part of the body, simply inflict large wounds. This would be the case for exploding bullets and dum-dum bullets. Table 1 of the study shows that conventional weapons produce less than 10% Grade 3 wounds. This figure would be exceeded by any missile or wave form which carried much more energy and which foreseeably deposited this energy in the human body over a short track.

In an attempt to move law away from an approach focusing on technology – as exemplified by the prohibitions on exploding and dum-dum bullets – towards an approach focusing on effect, the Swiss government has proposed to States a means of testing munitions for their potential to produce large wounds; the application of Criterion 3 to a weapon could be tested in a laboratory.²¹

Criterion 4 – exerts effects for which there is no well recognized and proven treatment

Criterion 4 is closely linked to Criterion 1. For the laser-damaged retina there is no known successful treatment even in the best facilities. The effects of other new weapons are not fully known and so treatment is unlikely to be successful.³⁷ This criterion also highlights the imbalance between the finance and technology that goes into the development of weapons on the one hand and, on the other, the comparatively scanty resources that are made available to treat the wounded and record the true effects of weapons on health.

5.4 Applying the criteria to different weapons

One or more of the four criteria apply to weapons which are already prohibited: Criterion 1 and possibly Criteria 2 and 4 apply to chemical and biological weapons; Criteria 2 and 3 apply to exploding bullets; Criterion 3 and possibly Criterion 2 apply to dum-dum bullets; Criteria 1 and 4 apply to blinding laser weapons. These criteria also apply to weapons which are subject to either a review of the law pertaining to them or widespread stigmatization: Criteria 1, 2 and 3 apply to “point-detonating” anti-personnel mines; Criterion 2 and possibly Criterion 1 apply to burning weapons.

Conventional weapons are not necessarily “lethal”; this is an important point to make when new weapons are considered in the context of the S_{IR}US Project. The term “non-lethal” has been applied to a new generation of weapons, implying that technological advances have provided the means to achieve military objectives whilst minimizing deaths and injuries. A variety of energy forms, physical agents and chemicals have been developed along these lines.^{24,25,37,38} This concept must be examined carefully from the point of view of the effects of such weapons. The purpose is to “disable” – to inflict disability – but the difficult question of how long the disability will last is not considered. If it is established what energy output, concentration or dose is “non-lethal” or temporary, one has also discovered what is lethal or permanent. Thus for new weapons the dividing line between “non-lethal” and “lethal” may be fine or non-existent. In tactical terms, new weapons will always be backed up by or used in conjunction with conventional weapons;^{24,25} “softening the target” may increase the “lethality” of conventional weapons. In addition, a doctor treating the wounded may have to treat people suffering from the effects of both conventional and “non-lethal” weapons. All new weapons can and should be considered in terms of their effects and therefore in relation to the four criteria.

With regard to weapons that are designed to blind, it has been argued that it is better to blind an enemy soldier than to kill him or her. This argument fails to

take into account the fact that conventional weapons are *not* 100% lethal, the psychological impact of sudden blindness,^{22,40} the extent of disability, or the impact on a society of its soldiers returning from battle having been irreversibly blinded. Criteria 1 and 4 apply.

Among other “non-lethal” weapons which should be studied in the context of the S_IrUS Project are chemical agents that render a person confused, demotivated or unconscious for a short period without lasting effects. To such a weapon, if it exists, whether Criteria 1 and 4 apply is arguable. However, there are three additional points to consider:³⁸ first, “softening the target” is still an important consideration; second, use of such an agent as a method of warfare is already prohibited under the Chemical Weapons Convention; third, a basic principle of pharmacology is that the only difference between a drug and a poison is the dose and it is unclear how the correct dose can be administered on the battlefield.

One cannot consider the effects of weapons in general without referring to nuclear weapons. Here Criteria 1, 2 and 4 would apply (burns and radiation sickness). The nuclear debate, which is discussed extensively in other fora, is not taken further in this document.

When military utility is being assessed, the primary use of the weapon concerned must be taken into account. Weapons used, for example, to disable tanks or ships must be sufficiently destructive for this purpose. Although the crews themselves are protected by the legal concept of “superfluous injury or unnecessary suffering”, they may still suffer severe injuries associated with high mortality when attacked by such weapons.²⁷ Criterion 2 apparently applies; however, in this context, it cannot be used as a determination of “superfluous injury or unnecessary suffering” because of the military need to use such weapons. Criterion 1 definitely applies to an agent or energy form which would cause the crew to suffer, for example, epileptic convulsions.

5.5 Do not all weapons cause “superfluous injury or unnecessary suffering”? Is any weapon acceptable?

Can a weapon cause injury which is not superfluous? Is there such a thing as necessary suffering? These questions pose a moral problem for pacifists, the medical profession and those who believe in complete disarmament.

Use of weapons must generate suffering. Whether use of weapons is necessary is a debate that goes beyond the scope of the S_IrUS Project which regards weapons as neither acceptable nor unacceptable. The project represents an

attempt to limit the types of weapon that might be used in war; this attempt will fail if the criteria are refuted because they do not represent total disarmament.

The S_IrUS Project involves drawing a clear and objective distinction between the effects of conventional weapons and the effects of other weapons. Legal and moral judgement can then be applied to this distinction. Endorsement of the S_IrUS Project amounts to recommendation that this distinction be recognized by States in meeting their obligations under international law.

In explaining the effects of weapons in an objective and understandable way to lawyers, governments and the military, the medical profession is making neither a moral nor a legal judgement about weapons. The paper adopted by the General Assembly of the World Medical Association (Appendix 1) states “No weapon is medically acceptable to physicians, but physicians can aid in making effective controls against weapons which cause injury or suffering so extreme as to invoke the terms of International Humanitarian Law”. The S_IrUS Project can help the medical profession to avoid making a moral judgement by recommending the criteria as a means of making a legal judgement. Medical ethics are not breached as this initiative has the potential to prevent specific injury; it is not aimed at preventing all injuries in war.

5.6 The S_IrUS Project and public opinion

Criterion 1 reflects the question as to whether weapons which target specific biochemical, physiological or anatomical features or weapons which target vital organs or functions should be prohibited.³ The process whereby knowledge of human form and function is used to develop weapons designed to interfere with that form and function seems to be considered genuinely abhorrent. It is no coincidence then that chemical, biological and blinding laser weapons have been prohibited. This may reflect the distaste for biomedical scientists being involved in weapon design and is linked to the ethical dilemma arising from the fact that much modern weapon design is based on medical knowledge.^{3,23,41,42} The measurable and foreseeable effects of conventional weapons provide a baseline, and this baseline pertains to injury and suffering caused by weapons when knowledge of human form and function are *not* the primary factor in their design. Thus there is an inevitable link between the Martens clause and Criterion 1. As there is proven treatment for the effects of few weapons to which Criterion 1 would apply, there is a link between the Martens clause and Criterion 4 also. Weapons from which a soldier cannot take cover, whose use may not immediately be detected or which poison heighten the reaction of abhorrence.

Stigmatization of any weapon system is an important factor in reducing the chance of its use; this applies not only to weapons which have been prohibited but also to napalm and to anti-personnel mines which are not, as yet, deemed illegal by all States. Endorsement of the SIRUS Project would provide an objective and precise means of focusing public opinion so that a new weapon whose effect would clearly be “abhorrent” or “inhuman” would not have to be deployed before the public conscience is stirred. The SIRUS Project as an element of public opinion runs parallel not only to the obligation of States to determine the legality of any weapon system they are developing but also to the responsibility of the medical profession to educate the public about health matters. The SIRUS Project provides a means for the medical profession to bring weaponry issues objectively into the public domain and at the same time to encourage the international community to recognize the grave implications of continued research and development of new means of warfare.^{1,3,25,38,41,42}

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Appendix 1

**The World Medical Association, Inc.
Proposed World Medical Association Statement
on
Weapons and their relation to life and health**

48th WMA General Assembly,
Somerset West, Republic of South Africa,
20 - 26 October 1996

PREAMBLE

The World Medical Association (WMA) recognises that when nations enter into warfare or into weapons development, they do so for strategic reasons which are usually short term. They do not consider the immediate or long term effects of the use of weapons on the health of individual non-combatants within their population and on the public health as a whole, either in the short or in the longer term.

Nevertheless the medical profession is required to deal with both the immediate and long term effects of warfare, and in particular with the effects of the use of different forms of weapons.

DEFINITION

In considering the role of physicians in the control of weapons-related injuries, suffering and deaths, the WMA recognizes that the effects of weapon use can be viewed as a public health issue. No weapon is medically acceptable to physicians, but physicians can aid in making effective controls against weapons which cause injury or suffering so extreme as to invoke the terms of International Humanitarian Law.

The potential for scientific and medical knowledge to contribute to the development of new weapons systems, targeted against specific individuals, specific populations or against body systems, is considerable. This could include the development of weapons designed to target anatomical or physiological systems, including vision, or which use knowledge of human genetic similari-

ties and differences to target weapons. Physicians involved in research into the effects of such weapons systems, whether as agents for weapons development companies or for control agencies, will face extraordinary ethical challenges as their work could be used by those who pay no regard to international law or accepted standards.

Although the effects of weapon use on non-combatant individuals and on groups or societies is identifiable there are no current and commonly used criteria to measure weapons effects. International Humanitarian Law states that weapons which cause injuries which would constitute “unnecessary suffering or superfluous injury” are illegal. The terms are not defined and require interpretation against objective criteria for the law to be effective.

Such criteria would aid lawyers in the use of International Humanitarian Law, allow assessment of the legality of new weapons currently in development against an agreed, objective system of assessment of their medical effects; and would identify those which would breach the Law if developed.

Physician involvement in the delineation of such objective criteria is essential if it is to become part of the legal process. However, it should be recognised that physicians are opposed to any use of weapons against human beings.

RECOMMENDATION

The WMA believes that the development, manufacture and sale of weapons for use against human beings is abhorrent. To support the prevention and reduction of weapons injuries the WMA :

1. supports international efforts, involving the International Committee of the Red Cross and others, to define objective criteria which would measure the effects of current and future weapons, and which could be used to stop the development, manufacture, sale and use of weapons;
2. recognises that modern medicine depends upon the continuous development of technology and insists that this technology must not be abused or diverted into weapons development;
3. calls on National Medical Associations (NMA's) to urge national governments to cooperate with the collection of such data as are necessary for establishing objective criteria;
4. calls on NMA's to support and encourage research into the global public health effects of weapons use, and to publicise the results of that research both nationally and internationally to ensure that both the public and governments are aware of the long term health consequences of weapons use on non-combatant individuals and populations.

Appendix 2

1977 Protocol I Additional to the Geneva Conventions of 1949.

Part I

GENERAL PROVISIONS

Article 1 – General principles and scope of application

1. The High Contracting Parties undertake to respect and to ensure respect for this Protocol in all circumstances.
2. In cases not covered by this Protocol or by other international agreements, civilians and combatants remain under the protection and authority of the principles of international law derived from established custom, from the principles of humanity and from the dictates of public conscience.
3. This Protocol, which supplements the Geneva Conventions of 12 August 1949 for the protection of war victims, shall apply in the situations referred to in Article 2 common to those Conventions.
4. The situations referred to in the preceding paragraph include armed conflicts in which peoples are fighting against colonial domination and alien occupation and against racist régimes in the exercise of their right of self-determination, as enshrined in the Charter of the United Nations and the Declaration on Principles of International Law concerning Friendly Relations and Co-operation among States in accordance with the Charter of the United Nations.

Part III

METHODS AND MEANS OF WARFARE

COMBATANT AND PRISONER-OF-WAR STATUS

SECTION 1 – METHODS AND MEANS OF WARFARE

Article 35 – Basic rules

1. In any armed conflict, the right of the Parties to the conflict to choose methods or means of warfare is not unlimited.

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2. It is prohibited to employ weapons, projectiles and material and methods of warfare of a nature to cause superfluous injury or unnecessary suffering.
 3. It is prohibited to employ methods or means of warfare which are intended, or may be expected, to cause widespread, long-term and severe damage to the natural environment.

Article 36 – New weapons

In the study, development, acquisition or adoption of a new weapon, means or method of warfare, a High Contracting Party is under an obligation to determine whether its employment would, in some or all circumstances, be prohibited by this Protocol or by any other rule of international law applicable to the High Contracting Party.

Part IV

CIVILIAN POPULATION

SECTION I – GENERAL PROTECTION AGAINST EFFECTS OF HOSTILITIES

Article 51 – Protection of the civilian population

1. The civilian population and individual civilians shall enjoy general protection against dangers arising from military operations. To give effect to this protection, the following rules, which are additional to other applicable rules of international law, shall be observed in all circumstances.
2. The civilian population as such, as well as individual civilians, shall not be the object of attack. Acts or threats of violence the primary purpose of which is to spread terror among the civilian population are prohibited.
3. Civilians shall enjoy the protection afforded by this Section, unless and for such time as they take a direct part in hostilities.
4. Indiscriminate attacks are prohibited. Indiscriminate attacks are:
 - (a) those which are not directed at a specific military objective;
 - (b) those which employ a method or means of combat which cannot be directed at a specific military objective; or
 - (c) those which employ a method or means of combat the effects of which cannot be limited as required by this Protocol;

and consequently, in each such case, are of a nature to strike military objectives and civilians or civilian objects without distinction.

Appendix 3

Declaration Renouncing the Use, in Time of War, of certain Explosive Projectiles

St. Petersburg

29 November/11 December 1868

On the proposition of the Imperial Cabinet of Russia, an International Military Commission having assembled at St. Petersburg in order to examine the expediency of forbidding the use of certain projectiles in time of war between civilized nations, and that Commission having by common agreement fixed the technical limits at which the necessities of war ought to yield to the requirements of humanity, the Undersigned are authorized by the orders of their Governments to declare as follows:

Considering:

That the progress of civilization should have the effect of alleviating as much as possible the calamities of war;

That the only legitimate object which States should endeavour to accomplish during war is to weaken the military forces of the enemy;

That for this purpose it is sufficient to disable the greatest possible number of men;

That this object would be exceeded by the employment of arms which uselessly aggravate the sufferings of disabled men, or render their death inevitable;

That the employment of such arms would, therefore, be contrary to the laws of humanity;

The Contracting Parties engage mutually to renounce, in case of war among themselves, the employment by their military or naval troops of any projectile of a weight below 400 grammes, which is either explosive or charged with fulminating or inflammable substances.

They will invite all the States which have not taken part in the deliberations of the International Military Commission assembled at St. Petersburg by sending Delegates thereto, to accede to the present engagement.

This engagement is compulsory only upon the Contracting or Acceding Parties thereto in case of war between two or more of themselves; it is not applicable to non-Contracting Parties, or Parties who shall not have acceded to it.

It will also cease to be compulsory from the moment when, in a war between Contracting or Acceding Parties, a non-Contracting Party or a non-Acceding Party shall join one of the belligerents.

The Contracting or Acceding Parties reserve to themselves to come hereafter to an understanding whenever a precise proposition shall be drawn up in view of future improvements which science may effect in the armament of troops, in order to maintain the principles which they have established, and to conciliate the necessities of war with the laws of humanity.

Appendix 4

Convention (II) with Respect to the Laws and Customs of War on Land and its annex:

Regulations respecting the Laws and Customs of War on Land.

The Hague

29 July 1899

SECTION II

ON HOSTILITIES

CHAPTER I

On means of injuring the enemy, sieges, and bombardments

Art. 22. The right of belligerents to adopt means of injuring the enemy is not unlimited.

Art. 23. Besides the prohibitions provided by special Conventions, it is especially prohibited -

- (a) To employ poison or poisoned arms;
- (b) To kill or wound treacherously individuals belonging to the hostile nation or army;
- (c) To kill or wound an enemy who, having laid down arms, or having no longer means of defence, has surrendered at discretion;
- (d) To declare that no quarter will be given;
- (e) To employ arms, projectiles, or material of a nature to cause superfluous injury;
- (f) To make improper use of a flag of truce, the national flag or military ensigns and uniform of the enemy, as well as the distinctive badges of the Geneva Convention;
- (g) To destroy or seize the enemy's property, unless such destruction or seizure be imperatively demanded by the necessities of war.

Appendix 5

Protocol for the Prohibition of the Use of Asphyxiating, Poisonous or Other Gases, and of Bacteriological Methods of Warfare

Geneva

17 June 1925

The undersigned Plenipotentiaries, in the name of their respective Governments:

(Here follow the names of Plenipotentiaries)

Whereas the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids materials or devices, has been justly condemned by the general opinion of the civilized world; and

Whereas the prohibition of such use has been declared in Treaties to which the majority of Powers of the world are Parties; and

To the end that this prohibition shall be universally accepted as a part of International Law, binding alike the conscience and the practice of nations;

Declare:

That the High Contracting Parties, so far as they are not already Parties to Treaties prohibiting such use, accept this prohibition, agree to extend this prohibition to the use of bacteriological methods of warfare and agree to be bound as between themselves according to the terms of this declaration.

The High Contracting Parties will exert every effort to induce other States to accede to the present Protocol. Such accession will be notified to the Government of the French Republic, and by the latter to all Signatory and Acceding Powers, and will take effect on the date of the notification by the Government of the French Republic.

The present Protocol of which the French and English texts are both authentic, shall be ratified as soon as possible. It shall bear today's date.

The ratifications of the present Protocol shall be addressed to the Government of the French Republic, which will at once notify the deposit of such ratification to each of the Signatory and Acceding Powers.

The instruments of ratification and accession to the present Protocol will remain deposited in the archives of the Government of the French Republic.

The present Protocol will come into force for each Signatory Power as from the date of deposit of its ratification, and, from that moment, each Power will be bound as regards other Powers which have already deposited their ratifications.

In witness whereof the Plenipotentiaries have signed the present Protocol.

Appendix 6

Review Conference of the States Parties to the Convention on Prohibitions or Restrictions on the Use of Certain Conventional Weapons which May Be Deemed to Be Excessively Injurious or to Have Indiscriminate Effects

Protocol on Blinding Laser Weapons (Protocol IV), 13 October 1995

Article 1

It is prohibited to employ laser weapons specifically designed, as their sole combat function or as one of their combat functions, to cause permanent blindness to unenhanced vision, that is to the naked eye or to the eye with corrective eyesight devices. The High Contracting Parties shall not transfer such weapons to any State or non-State entity.

Article 2

In the employment of laser systems, the High Contracting Parties shall take all feasible precautions to avoid the incidence of permanent blindness to unenhanced vision. Such precautions shall include training of their armed forces and other practical measures.

Article 3

Blinding as an incidental or collateral effect of the legitimate military employment of laser systems, including laser systems used against optical equipment, is not covered by the prohibition of this Protocol.

Article 4

For the purpose of this Protocol “permanent blindness” means irreversible and uncorrectable loss of vision which is seriously disabling with no prospect of recovery. Serious disability is equivalent to visual acuity of less than 20/200 Snellen measured using both eyes.

The *International Committee of the Red Cross (ICRC)* and the *International Federation of Red Cross and Red Crescent Societies*, together with the *National Red Cross and Red Crescent Societies*, form the International Red Cross and Red Crescent Movement.

The ICRC, which gave rise to the Movement, is an independent humanitarian institution. As a neutral intermediary in the event of armed conflict or unrest it endeavours, on its own initiative or on the basis of the Geneva Conventions, to bring protection and assistance to the victims of international and non international armed conflict and internal disturbances and tension.

