

# Britain's New Nuclear Weapons

**Illegal, Indiscriminate, and  
Catastrophic for Health**



# Summary

Since the first deployment of its Trident nuclear weapon system in 1994, the UK has upgraded it by developing low yield warheads which may be as low as 1 kilotonne (1kt). It is most likely that any replacement of Trident will have the same flexibility,<sup>1</sup> with the same implication that this weapon would therefore be 'smart' and cause fewer civilian deaths and less injury.

This briefing challenges the very basis of these developments from a public health perspective. By detailing the consequences of a 1kt nuclear explosion it shows that no nuclear weapon, however low its yield, could ever be discriminate and so is illegal under international law. It exposes the myth of the possible 'surgical' use of a low yield nuclear weapon, and shows why the development of small nuclear weapons by a nuclear weapons state is likely to have dire consequences for nuclear proliferation.

This briefing describes why doctors, nurses and other health professionals have consistently opposed nuclear weapons – because any nuclear explosion would be a health catastrophe. It details the effects from blast, heat, initial and residual radiation and the health hazards of the nuclear cycle.

Medact concludes that the UK carries significant responsibility for the way it influences events. Firstly, renewing Trident will remove any moral authority the UK may have in trying to persuade non-nuclear weapon states not to acquire nuclear weapons. Secondly, it will contribute to a new arms race which will bring with it all the dangers of the old: attempted justification of pre-emptive strikes, escalating retaliation scenarios, misinformation about the 'smartness' of some weapons, misinformation about the perceived 'enemy', blurring of the distinction between nuclear and non-nuclear weapons, and a massive diversion of resources. The result is the renewed threat of death, injury, sickness and destruction on an unimaginable scale.

# Legality

A weapon that can cause the terrible effects outlined in this briefing can never be claimed to be discriminate. If it is indiscriminate it is illegal under international law.

## Geneva Convention 1949:

### Additional Protocol 1977 part 4 Article 51

Indiscriminate attacks are those which are not directed at a specific military objective; those which employ a method or means of combat which cannot be directed at a military objective; or ...the effects of which cannot be limited as required by this Protocol. Among others the following types of attack are to be considered as indiscriminate:

- a) an attack by bombardment by any method or means which treat as a single military objective a number of clearly separated and distinct military objectives located in a city town or village or other area containing a similar concentration of civilians or civilian objects; and
- b) an attack which may be expected to cause incidental loss of civilian life, injury to civilians, damage to civilian objects or a combination thereof which would be excessive in relation to the concrete and direct military advantage anticipated.

## The present situation

With the end of the Cold War the Government's official rationale for deploying Trident, to deter a Soviet nuclear attack, could no longer justify its existence. In these circumstances a new rationale for Trident has been advanced by the UK government – Trident could be used to make a 'surgical' type strike as part of a war against a non-nuclear state.

However the UK public is fundamentally opposed to the use of nuclear weapons against non-nuclear states – in September 2005 a Greenpeace/MORI poll found that 87% of the UK public were opposed to using nuclear weapons against a non-nuclear state – and the International Court of Justice has stated that such a use is against international law. To convince the former and get around the latter, the supporters of a new role for Trident argue that:

- **there are some circumstances in which the legal prohibition against the use of nuclear weapons against a non-nuclear state should be set aside.** This has been done by suggesting that 'rogue' states armed with chemical or biological weapons are an immediate threat to the UK population, and by arguing that we have 'vital interests' such as trade, investments, and access to resources such as oil which are vulnerable to attack by such states, with catastrophic results for the UK.
- **Trident can be re-made so that it is just like a 'smart' conventional weapon that can be used against military targets without killing (many) civilians.** This has been done through the technical transformation of Trident. UK Trident submarines now have some missiles with only one nuclear warhead. The government and the Atomic Weapons Establishment have suggested that the UK has adapted this warhead so that it could give a much smaller explosion – according to some experts the yield could be reduced from 100kt to 1kt.<sup>3</sup>

This strongly suggests that any replacement of Trident will be a low yield nuclear weapon or will have an adjustable yield so that it can be adjusted to function as one.<sup>2,4</sup> The theory of the 'smart' bomb has already been advanced in relation to conventional weapons, however when the United States used weapons it had defined as such in Iraq against targets close to civilians it resulted in large numbers of dead and injured. The conversion of Trident and any likely replacement of Trident to use mini-nuclear warheads would take this to a new level of insanity. The taboo against nuclear weapons rests on the fact that it is widely appreciated that their use will lead to large numbers of civilian deaths, both immediately and over time from radiation. It is completely mistaken to suggest that it is possible to build a nuclear weapon that could have any other result. There is a clear and present danger that the repeated assertion that new kinds of 'smart' nuclear weapons can be used discriminately is being used to break down the taboo against their use, including in a pre-emptive strike against conventional forces. In the run up to the UK US invasion of Iraq Geoff Hoon – the then Secretary for Defence – said in the House of Commons in March 2002: 'I am absolutely confident, in the right conditions, we would be willing to use our nuclear weapons.'<sup>5</sup>

# No nuclear weapon could ever be discriminate

## The consequences of a one kilotonne (1kt) nuclear explosion produced by a small nuclear weapon

Nuclear explosions cause thermal radiation (heat), air-blast, initial nuclear radiation and residual radioactive fallout. The effects of the first three on humans are prompt and harm is inflicted immediately. By contrast, the radiation dose from fallout is delivered over extended periods of time, stretching to decades in the case of exposure to long-lived radionuclides.<sup>6</sup>

Within the first few seconds of a 1kt airburst nuclear explosion it is estimated that virtually everyone within a 600m radius will be killed. Within 200m there will be 100% mortality from the heat alone, and everyone within 800m who is directly exposed to the blast will be killed.<sup>7</sup>

Any survivors within a 500m radius will have third degree burns involving the destruction of the full thickness of the skin; within a 800m radius they will have second degree burns causing intense pain and blistering of the skin.

Those looking in the direction of the flash within 19km of ground zero (the point of the explosion) may suffer temporary flash blindness, and may be permanently blinded by retinal burns.<sup>6</sup>

The blast is experienced as a sudden and shattering blow, immediately followed by a hurricane force wind. Those standing in the open will be swept up by the wind and carried above the surface of the ground, hitting other objects and being hit by loose flying debris, including flying glass, which forms deadly projectiles which can kill and injure. People who are inside may be crushed under the weight of falling buildings, or even suffocated by the dense dust of crushed bricks and mortar. Within 400m all buildings will be destroyed, and within a 2km radius there will be damage to most structures.<sup>6</sup>

### The Medical Effects of Radiation

#### *Radiation Injuries*

Very high doses of radiation can cause radiation injuries with major adverse effects on nerves and blood vessels. This can result in a short interval of mental alertness followed quickly by convulsions, hypotension, coma and death.

#### *Radiation Sickness*

a) Ionising radiation damages the inner lining of the gut and can result in loss of appetite, nausea, vomiting and diarrhoea. With higher doses, after a short latent period, this can be followed by severe diarrhoea and gastrointestinal bleeding leading to dehydration and electrolyte imbalance which are fatal if untreated. Other early symptoms include hair loss, eye cataracts and severe psychological trauma.

b) Ionising radiation damages the bone marrow and particularly affects the production of white blood cells and platelets, leading to overwhelming infections (lack of white blood cells) and bruising and bleeding (lack of platelets). Even with medical treatment the results are very often fatal.

If pregnant women are exposed to radiation it can result in stillbirth, spontaneous abortion, neonatal death and congenital malformation. Babies can be born with a low birth weight, mental retardation and/or microcephaly.

Smaller fires ignited by the explosion can coalesce into a huge firestorm, within and close to which all objects will be vaporised or melt. The fire will also prevent the escape of survivors, and destroy health and emergency services.

Severe burns require immediate treatment to prevent dehydration, control pain and prevent infection; however emergency services will themselves be severely affected, and emergency workers in the area may often be suffering the same injuries.<sup>8</sup>

Nuclear detonations release very large amounts of neutron and gamma radiation. In lower yield nuclear explosions, such as a 1kt bomb, the casualties from lethal ionising radiation are even greater than those from lethal blast and thermal effects. As the bomb explodes, intense ionising radiation is emitted. Within a radius of 1km there will be almost 100% fatality among those directly exposed to the acute effects of radiation.

When a nuclear detonation occurs close to the surface, soil, water, debris and the weapon's highly radioactive fission products are sucked up by the fireball into the atmosphere. This radioactive material in the shape of a plume is then carried by weather patterns and falls back to earth gradually over periods of weeks, months or years,<sup>7</sup> as *fallout*.

The resulting radiation exposures occur via four main pathways:

- External exposure by the plume as it passes overhead
- Inhalation of radionuclides in the plume
- Continuing external radiation from radionuclides deposited on the ground
- Ingestion of contaminated food.

Small yield weapons produce more fallout in proportion to their size compared to larger yield weapons. Unprotected people living 3 km downwind from a small 1kt groundburst will receive fatal doses of radiation from fallout alone within one hour of the explosion. Unprotected people living approximately 7 km downwind will receive a very serious dose within one hour, and fatal doses after a few hours.<sup>7</sup>

## The myth of 'limited use'

The idea that in actual war commanders would use only one or two small nuclear weapons against targets far from civilians is unrealistic. The history of bombing has discredited the theory that the precision use of conventional bombs could destroy military and economic targets without many civilian casualties. In wars from World War II to present day Iraq, enemy countermeasures and continued resistance, the location of key targets close to civilians, and misinformation are among the factors that have led to imprecise and widespread bombing resulting in large numbers of civilian casualties.<sup>9,10</sup> This history suggests that we should not be seduced by the rhetoric of 'smart' nuclear weapons, which can make their use more thinkable and their development and deployment more likely. It shows that the single use of small nuclear weapons on remote facilities is a highly unlikely scenario. Repeated use of these weapons as conflict escalates would result in horror on an unimaginably vast scale. It may also produce a retaliation in kind and unleash a global nuclear exchange.

# Dire consequences for non-proliferation

*'We escaped the Cold War without a nuclear holocaust by some combination of skill, luck and divine intervention, and I suspect the latter in greatest proportion.'*

**General Lee Butler, former Commander of US Strategic Forces<sup>11</sup>**

The development by the nuclear weapons states of small nuclear weapons brings the end of a 60- year moratorium on the use of nuclear weapons a step closer. Such a development clearly lowers the threshold of use – and its perception – with dire consequences for proliferation. It would breach the obligations of the nuclear weapons states under the Non-Proliferation Treaty.

Threshold states, such as Iran and North Korea, would be able to cite this as a reason to continue work on their own nuclear capabilities.

The Cold War is sometimes presented as an era that eventually reached some sort of stability due to the massive arsenals of the United States and the former Union of Soviet Socialist Republics and their shared fear of mutually assured destruction (MAD). It did in fact include times of terrible risk,

## Health hazards of the nuclear cycle

Health risks from exposure to ionising radiation occur at all stages of nuclear weapons testing, manufacture and deployment, and from the civil nuclear energy fuel cycle. Plutonium or highly enriched uranium are essential for nuclear weapons and can be diverted from a civil nuclear energy programme.

### *Link between uranium mining and lung cancer*

Uranium is an essential component of nuclear weapons and energy production. It is mined in the US, Australia, Central Europe, France, Africa and Argentina. The death rate for uranium miners from lung cancer is five times higher than for the general population.

### *Long-term effects of nuclear testing in the US, the USSR and the Pacific*

The legacy of atmospheric tests in the 1950s and 1960s will remain with us for centuries. Leukaemia, thyroid cancer and other cancers are attributed to the radioactive fallout from these tests.

### *Radioactive materials released from nuclear sites*

Ionising radiation is a cause of cancer. A study of over 14,000 workers at a nuclear site in NW England found a small but significant excess of cancers of the pleura and thyroid. Clusters of childhood leukaemia have been reported round Sellafield, Dounreay and Aldermaston in the UK.

### *Serious impacts of accidents at nuclear plants*

Significant leaks of radioactive material have occurred at Sellafield in the UK and widespread contamination has occurred following accidents at Mayak, Kyshtym and Chernobyl in the former USSR. At Chernobyl in particular, this has resulted in thousands of deaths, major long-term illness and massive psychosocial upheaval.

### *Standard models of radiation effects need updating*

New findings on the pathological consequences of low-level internal radiation, particularly from alpha-emitters, new concepts of genomic instability, and the latest information on cancers caused by Hiroshima, all suggest that present standard models are not sufficient to capture the true radiation effects.

first strike policies and grave distortions of information for public consumption.<sup>12</sup> However, during the 1980s popular protest, such as that at Greenham Common, was successful in helping to get rid of Cruise missiles from the UK and Soviet Pershing and SS20s from Europe. Eventually the dangerous stand-off situation also shocked the world into reducing the nuclear threat through increased detente, the decommissioning of weapons, the Nuclear Non-Proliferation Treaty, and the Comprehensive Test Ban Treaty which still awaits entry into force.

These Treaties today are under threat. This comes from non-nuclear states seeking to acquire nuclear weapons, but principally from nuclear states seeking to evade their responsibilities and to develop new nuclear weapons under the guise of 'smartness' and the smog of 'a new security environment'. The hypocrisy of the nuclear states means that non-nuclear states feel increasingly vulnerable, and as a result feel the need for ever greater protection. This new arms race brings with it all the dangers of the old: attempted justification of pre-emptive strikes, escalating retaliation scenarios, misinformation about the 'smartness' of some weapons, misinformation about the perceived 'enemy', blurring of the distinction between nuclear and non-nuclear weapons, and a massive diversion of resources. The result of all this is the renewed threat of death, injury, sickness and destruction on an unimaginable scale.

## Conclusion

As a nuclear power the UK carries significant responsibility for the way it influences events. The development of a new nuclear weapon will push us all further in a new arms race with all its risks and dangers. It will also remove any moral authority the UK may have in trying to persuade non-nuclear states not to acquire nuclear weapons, making this more likely.

The argument that a smaller 1kt weapon would in some way be 'discriminate' and proportionate in its effects has been shown in this briefing to be untrue. This means these weapons are illegal and it is important to counter the misinformation in any way we can.

Finally, for health professionals as for others, the development of such a weapon would not only be highly dangerous but a huge waste of resources. The capital cost of a replacement similar to the present system is likely to be at least £30 billion as typically replacement weapon systems double in cost each decade.<sup>14</sup> If the annual maintenance costs for the next 30 years are included it is more likely to be in the region of £76 billion.<sup>15</sup> At a time when our National Health Service is acutely short of funds, to embark on a programme that would divert massive resources and potentially create death and sickness on a massive scale is totally irresponsible.

## References

- 1 Rogers P (2006) Big boats and bigger skimmers: determining Britain's role in the Long War. *International Affairs* 82.4: 651-665.
- 2 Booth K & Barnaby F Eds (2006) *The Future of Britain's Nuclear Weapons: Experts reframe the debate.* Current Decisions Report. Oxford Research Group
- 3 Greenpeace (2006) Why Britain Should Stop Deploying Trident: 8-9
- 4 Norris R & Kristensen H (2005) British Nuclear Forces Bulletin of the Atomic Scientists 62.2 Nov-Dec 2005
- 5 Young, H. 'Hoon's Talk of Pre-emptive strikes could be catastrophic', *The Guardian*, June 6, 2002.
- 6 Medical Effects of Nuclear War (1983) Report of the British Medical Association Board of Science & Education
- 7 The Medical Consequences of Nuclear Weapons (1982) Medical Campaign against Nuclear Weapons & Medical Association for the Prevention of War
- 8 World Health Organisation (1988) *Effects of Nuclear War on Health and the Health Services.* 2nd Edn
- 9 Sheery, M. *The Rise of American Air Power: The Creation of Armageddon*, (Yale, 1987).
- 10 Doswald-Beck L (2006) Paper delivered to the Conference on Freedom from Nuclear Weapons through Good Faith and Accountability, Brussels
- 11 Butler, L (1998) Address to the Canadian Network Against Nuclear Weapons.
- 12 Butler L (2006) At the end of the journey: the risks of Cold War thinking in a new era. *International Affairs* 82.4: 763-769
- 13 Medical Campaign against Nuclear Weapons (1988) *Even Before the Bomb Drops.*
- 14 Hartley, Keith, 'The Economics of UK Nuclear Weapons', *International Affairs*, 82.4 (RUSI, 2006): 679.
- 15 *Guardian* November 5th (2006) 'Global warming: could scrapping these .....save this?'

# Any nuclear explosion is a health catastrophe

## How health professionals have led the campaign against nuclear weapons

Doctors, nurses and other health professionals have a long and honorable history of opposing the development, testing and use of nuclear weapons.

In 1963 the signing of the Partial Test Ban Treaty came about largely because the medical and dental professions, especially in the United States and the United Kingdom, played a vital role in awakening the public to the urgency of the health threat posed by atmospheric nuclear tests. After arrangements were made for children's deciduous teeth to be examined, the widespread presence of Strontium-90 – a fission product that accumulates in babies' teeth – was made public. The outrage of parents ensured that fallout was no longer an abstraction, and led to a test ban treaty. Nuclear testing, however, continued to be carried out underground until further protest and lobbying brought about the Comprehensive Test Ban Treaty in 1996. The other effects of the nuclear tests – on the health of those who had to participate, on the inhabitants of the areas used as testing sites, and on those who mine materials such as uranium – continue to this day.<sup>13</sup>

A pamphlet by the Medical Campaign Against Nuclear Weapons (MCANW) and the Medical Association for the Prevention of War on 'The Medical Consequences of Nuclear Weapons' published in 1982, and concerted lobbying by health professionals, helped bring about the British Medical Association's 1983 report 'The Medical Effects of Nuclear War' and changed UK government policy on nuclear defence.

In 1985, the International Physicians for the Prevention of Nuclear War (IPPNW) of which MCANW was the UK affiliate, won the Nobel Peace Prize, giving further impetus to the campaign.

In 1987, MCANW launched a 'Beds not Bombs' campaign in which hundreds of health workers pushed beds along streets to draw attention to the resource and health implications of the development of nuclear weapons, especially Trident.

In 1988, IPPNW – by now a federation of national physicians' groups in 70 countries - created an international commission to study the health and environmental effects of nuclear weapons production which resulted in the report 'Radioactive Heaven and Earth'.

In 1988, MCANW published a pack called 'Even Before the Bomb Drops' which showed the widespread social and environmental effects of the nuclear arms race.

Medact, formed in 1992 as a merger of MCANW and the Medical Association for Prevention of War (MAPW), has, with other affiliates of IPPNW, continued to call for the abolition of nuclear weapons primarily because of their catastrophic health effects.

### Writing & Editorial team

**Douglas Holdstock**, Editor, *Medicine, Conflict and Survival* **Liz Waterston**, Board Member, International Physicians for the Prevention of Nuclear War **Dominick Jenkins**, Senior Disarmament Advisor, Greenpeace **Gill Reeve**, WMD consultant, Medact **Ian Fairlie**, Executive Board member, Medact **Marion Birch**, director, Medact

Medact would like thank Greenpeace for their support



The Grayston Centre  
28 Charles Square  
London N1 6HT

Medact is a UK charity for global health, working on issues related to conflict, poverty and the environment

tel 020 7324 4739 email [info@medact.org](mailto:info@medact.org) [www.medact.org](http://www.medact.org)

Medact: Registered Charity 1081097. Company Reg. No. 2267125.