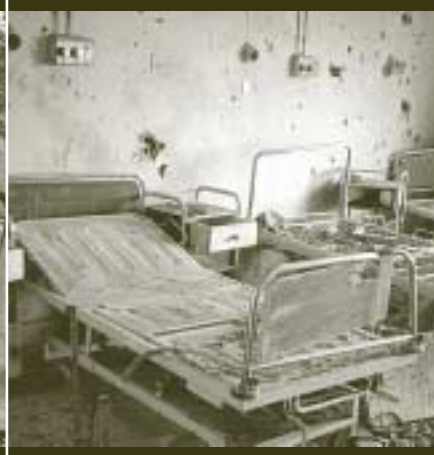
collateral damage

the **health** and **environmental costs** of **war on Iraq**



challenging barriers to health

This analysis of the previous, ongoing and likely future conflict with Iraq spells out the potentially enormous humanitarian costs of waging war. It would mean disaster for the Iraqi population, in both the short and long term, and would cause much harm further afield. This evidence-based report draws on best estimates, and concludes with a summary of the alternatives to war. Its value base is that of Medact – an organisation of doctors, nurses and other health professionals undertaking education, research and advocacy on the health impacts of violent conflict, environmental degradation and poverty.

A longer version of this report is available at www.medact.org

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Introduction

The threatened war on Iraq could have disastrous short, medium and long-term consequences not only for the Iraqi population and its neighbours, but also further afield.

Its likely impact must be taken into account when considering such a step, to ensure that applying this solution to the problems posed by Saddam Hussein is less damaging than the problems themselves.

War is a major hazard to health and its impact may be felt months, years or decades later. Modern warfare usually leads to more casualties among civilians than combatants (BMA 2001), while the destruction of roads, railways, homes, hospitals, factories and sewage plants creates conditions in which the environment is degraded and disease flourishes. A population suffering from the immediate impact of war is more susceptible to further health hazards and less able to mobilise its own resources for survival and reconstruction.

This report describes the immediate and longer-term impact of 1990-1 Gulf War and assesses the effects of establishing sanctions, no-fly zones and the Oil-for-Food programme. It concludes that the health of the Iraqi people is now much worse than it was in 1990. A fresh conflict is likely to be wider-ranging and use a new arsenal of weapons, and its impact is likely to be more profound. The report concludes with a brief summary of the alternatives to war.

In reaching its conclusions our report team reviewed many sources but was hampered by the quality of the data and the many discrepancies. Much data is not available, not collected and/or not published, or its quality is questionable. Statistical, methodological and interpretative errors bedevil most of the available information but erroneous figures are repeated from one apparently authoritative source to the next (Garfield 1999a). More than a decade into one of the major humanitarian disasters of our time, we are left to debate causes and responsibilities without an adequate information base.

The report draws on the best evidence and expert views it could obtain, and in every case shows either the range of credible estimates or the most reliable estimate, erring on the side of caution. The authors of the studies cited here cannot be held responsible for any inadvertently erroneous conclusions.

Iraq past and present

Four-fifths of Iraq's 25 million people are Arab, the remainder mostly Kurds. Most of its 62% Shia Muslims live in the south, with the 35% Sunni Muslims dominant in the central region and among the ruling class.

Baghdad has five million people; other major urban centres are Diyala, Basra, Mosul, Kirkuk and the Kurdish capital Arbil (*The World Guide 2001/2002*). Iraq has 10% of the world's oil reserves, and in the decades before the 1990-1 war it evolved from an impoverished, rural, undeveloped country to a reasonably prosperous, urbanised, middle-income range one with a modern social infrastructure and good public services.

The Iran-Iraq war of 1980-1988 began a year after Saddam Hussein became president. It severely weakened the country militarily and economically, with at least 100,000 Iraqi deaths and many more injured or captured. Yet the civilian infrastructure was relatively unscathed except in the south-east, where the oil-rich area around Basra was hard hit, as it was again in 1990-1.

Health continued to improve in the 1980s, albeit more slowly than before. Infant mortality, an important socio-economic indicator, fell to 65 per 1000 live births just before the Gulf War, better than the developing country average of 76. By 1998 it had risen again to 103, however. Reflecting the huge deterioration in health in the 1990s, Iraq's under-five mortality rate is now 37th worst in the world – on a par with Haiti, Senegal, Yemen and Uganda (all UN figures; see also Tables 3 and 4, pp 4-5).

By 2000 Iraq occupied a lowly 126th place out of 174 in the UN Human Development Index, a league table showing countries' overall development level (for comparison: the US is 3rd, the UK 10th, Israel 23rd and Iran 95th). In 1990 it was ranked 50th out of 130, and in 1995 106th out of 174 (Unicef 2002).

The 1990-1991 Gulf War

Iraq invaded Kuwait on August 2, 1990. A Coalition of 28 countries led by the US launched Operation Desert Storm on January 17, 1991. After heavy bombing of targets in Iraq and Kuwait, a ground offensive was started on February 24, lasting 100 hours. Iraq withdrew but the massacre of troops retreating from Kuwait continued until a ceasefire two days later. UN resolution 687 required Iraq to implement a programme of disarmament before sanctions imposed in 1990 would be lifted. In March, the Kurds in the north and Shia population in the south rose up against Saddam Hussein but the rebellions were quickly and brutally crushed.

Immediate casualties

Less than 400 Coalition combatants died in the war and less than 500 were wounded in action. Most of the forces that bore the brunt of the Coalition attack were predominantly Kurdish and Shia conscripts. The most reliable estimates of Iraqi military deaths during the war range from 50,000 to 120,000 (UN 1991, Daponte 1993, Haines and Doucet 1993). When 3,500-15,000 civilian deaths are added the short-term Iraqi death toll is in the range 53,500-135,000 (Hoogland 1991, Daponte 1993). A further 20,000-35,000 Iraqi civilians died in the uprisings and other postwar violence (UN 1991, Daponte 1993).

Later mortality from battle injuries

Military sources estimate the number of wounded at three times the number of deaths. This would suggest a total of at least 300,000 wounded Iraqi combatants, some of whom would later die or suffer lifelong disability. Later mortality and morbidity among coalition combatants is the subject of controversy; official figures may be underestimated and there is no agreement on, for example, the effects of 'Gulf War Syndrome' or depleted uranium exposure.

TABLE 1 **Iraqi deaths directly attributable to the Gulf War**

Iraqi military deaths	100,000-120,000
Iraqi civilans during war	3,500-15,000
Iraqi civilians from February to end April 1991	4,000-6,000
Iraqi civilian deaths in civil war	20,000-35,000
Refugee deaths	15,000-30,000
total	**between 142,500 and 206,000**

Source: UN 1991 – the Ahtisaari report; Daponte 1993

Infrastructure

Iraq's infrastructure was extensively damaged – roads, bridges, communications, electricity supplies, water and sewage systems, weapons factories, health care facilities, administrative centres, warehouses, homes and much more. This had a catastrophic impact on a highly mechanised, electricity-dependent society (Hoskins 1997). Declassified documents from the US Defense Intelligence Agency show that a deliberate decison was made to destroy electricity-generating facilities and water storage and treatment, and then put chlorine and medicine on the UN embargo list (Nagy 2001). The wide-ranging and cumulative effects provided the preconditions for famine and epidemic.

The environment

Over two dozen chemical, biological and possibly nuclear factories and stores were destroyed or badly damaged, and toxins widely dispersed. A UN mission in March 1991 found 650 out of 1330 active oil wells ablaze, releasing acrid smoke that spread many hundreds of miles and had respiratory and carcinogenic health effects. Many other wells were gushing oil; between four and eight million barrels entered the sea and 35 to 150 million barrels were spilled over up to 60% of Kuwait, evaporating toxins into the air and contaminating groundwater. Bombing and troop movements destroyed hundreds of square miles of desert surface and its delicate ecology. Landmines destroyed the environment as well as killing and maiming humans and animals. The environmental damage was arguably unprecedented (Greenpeace 1992, Hoskins 1997).

Biological and chemical pollutants possibly damaged the flora, fauna and food chain, and may have harmed human health (Hoskins 1997). The impact of depleted uranium from radioactive shell material is a matter of conjecture (Caldicott 2002). The actual and potential effects on Iraqi and Kuwaiti civilians, as well as combatants on both sides, are not known.

Refugees

By April 1991 an estimated 1.8 million mainly Kurdish and Shia refugees had fled to the Iranian and Turkish borders. The massive dislocation, travel conditions, squalid camps, malnutrition, harsh weather, inadequate shelter, lack of clean water and minimal health care led to many deaths. Infectious diseases were rife, including measles, diarrhoea, typhoid and cholera, affecting not only the very old

and very young but also the victims of landmines and war-related accidents. By May 1991 between 15,000 and 30,000 refugees had died (UN 1991).

Economic collapse

Iraq's oil industry was a major target of air strikes and sanctions. As a result, the 1989 Gross Domestic Product of $66 billion fell 270 times to $245 million in 1992 (Quinn 1994). This massive collapse led to lack of investment in reconstruction. Most of Iraq's industrial base depended on imports and these rapidly became unavailable.

Civilian mortality and morbidity

Food shortages began immediately after the war, attributable to lack of supplies, lack of new crops, hyperinflated prices, damage to infrastructure such as processing plants and warehouses, and the effects of the UN embargo. Rations were only 750-1000 calories per person per day. Most Iraqi families had too little money to meet basic requirements such food and other essentials (Hoskins 1997), and the weakest suffered most.

An estimated 110,000 Iraqi civilians died in 1991 from the health effects of the war, bringing the total number of Iraqis who died as a direct consequence of the Gulf War to around 205,000 (Arkin, Durrant and Cherni 1991, Hoskins 1997). The health of many more was weakened in the longer term. Many people were internally displaced (750,000 remain so today) and around 9000 homes were destroyed or damaged. Many were injured through bombing and war-related accidents and more vulnerable to health risks. Most civilians suffered short-term episodes of post-traumatic stress and a minority would go on to suffer long-term mental health problems, leading sometimes to earlier death through heart disease or depressed immune systems (Hamblen and Schnurr 2002).

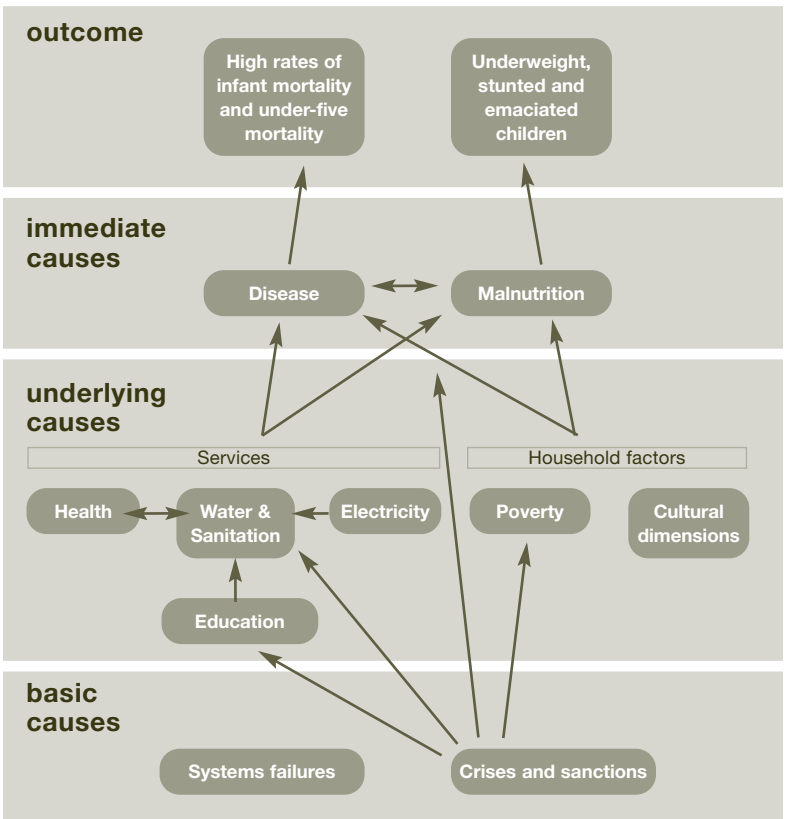
A Harvard-based international study team estimated that child and infant mortality increased more than threefold from January to August 1991 compared to the previous six years, corresponding to an excess of about 47,000 deaths among children under five (International Study Team 1991, Ascherio 1992). Thousands of children were handicapped by landmines and other war-related incidents (Hoskins 1997). Table 2 shows how social and economic factors interact to jeopardise Iraqi children's rights to life and survival (Unicef 2002). Many war widows became sole wage earners, often going hungry to feed their children; possibly 60% suffered from psychological problems, with physical manifestations such as weight loss and difficulty breast-feeding (Hoskins 1997).

Health services

Iraqi health services, previously described by WHO as 'a first-class range of medical facilities', could not cope. The Ministry of Health was directly hit, telecommunications were lost, and transport capability reduced to 10%, preventing the distribution of essential medical supplies. Primary health care and preventive activities ceased – there was no antenatal care, and immunisation programmes were temporarily reduced leading to a resurgence of preventable diseases (Hoskins 1997). Devastated health services could offer little help to those with mental or physical illness. Mental health care was in any case poorly developed and ill-equipped to deal with war-related mental disorders. Rehabilitation services for war-injured combatants and civilians were minimal.

In summary, the conflict wrought 'near-apocalyptic results' on the economic infrastructure of what had been a fairly highly urbanised and mechanised society (UN 1991). 'Now, most means of modern life support have been destroyed or rendered tenuous. Iraq has, for some time to come, been relegated to a pre-industrial age, but with all the disabilities of post-industrial dependence on an intensive use of energy and technology,' its Ahtisaari mission concluded.

TABLE 2 **Causal analysis of the fulfilment of children's rights to life and survival in Iraq**



Adapted from Unicef (2002)

The longer-term impact of the Gulf War

The impact of the war did not end with the conflict and its immediate aftermath. Recovery and reconstruction were hindered by the subsequent actions of Saddam Hussein, the UN and coalition countries.

Vulnerable groups suffered further and the longer-term impact was far worse than the immediate direct effects. UN sanctions, the Oil-for-Food Programme and the 'no-fly zones' all in different ways influenced health and environmental status, the economy, the rate of reconstruction, and the marked variations in impact on the north, central and southern regions of Iraq.

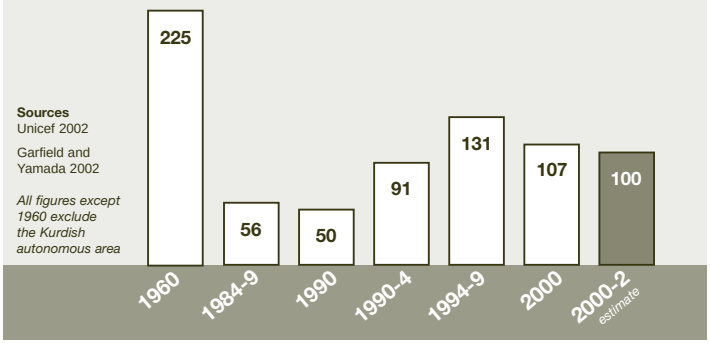
Sanctions

Comprehensive economic sanctions against Iraq were imposed in 1990 under UN resolution 661 and remain in place to this day. Partly as a result, according to a US academic, 'the population moved from the edge of first-world status to poor, third-world status with staggering speed' (Pellett 2000).

Oil-for-Food Programme

Oil-for-Food (OfF) delivered its first goods in 1997. It permits Iraq to sell oil to fund relief, providing commodities but no training or infrastructure development. An average of $18 worth of food and medicine per head per month are distributed. Social decline was already accelerating when it began, and although it has prevented a humanitarian disaster it is reckoned to be far less effective than traditional relief programmes (Garfield 1999b). OfF currently faces serious implementation problems owing to a 'dire funding shortfall', its director told the UN Security Council in September 2002.

TABLE 3 **Deaths of children under five per 1000 live births in Iraq, 1960-2002**



Sources
Unicef 2002
Garfield and Yamada 2002

All figures except 1960 exclude the Kurdish autonomous area

No-Fly Zones

Northern Iraq was declared a 'no-fly zone' after the Kurdish uprising was crushed in 1991. Another no-fly zone was established in the south in 1992 and was extended to the whole country south of Baghdad by US missile attacks in 1996. Between 1991 and 1999 the US and UK flew more than 6000 sorties, dropped over 1800 bombs and hit more than 450 targets in these zones, in which only Iraqi planes are forbidden. Turkey has also bombed the north.

The impact on life in Iraq

Sanctions and the Iraqi government response together create continuing shortages of government-supplied essentials such as electricity, water, food, medicines and basic education, and/or people lack the money to buy them. The UN estimated that 55% of Iraqis lived in poverty and 20% in extreme poverty in the late 1990s. While the situation is improving, people continue to suffer from drastically worse conditions than the pre-sanctions period.

Those most likely to be affected by sanctions include pregnant and lactating women, children under five, older people and those with chronic diseases. Garfield suggests an excess of between 344,000 and 525,000 under-five deaths in the 12 years of sanctions – far outnumbering deaths on all sides among combatants and civilians during the war (Garfield and Yamada 2002). Among the children who survive, likely health and social problems include the downward spiral of reduced mental capacity due to malnutrition, reduced educational achievement because of dropping out of school, social deterioration from family breakdown and poverty, and reduced governability through increases in crime and lawlessness. 'Excess deaths should thus be seen as the tip of the iceberg,' Garfield notes.

The negative effects of sanctions have been partly mitigated by OfF. Food production increased; rations were usually complete and timely in the centre/south. A large survey in Iraq in 1999 concluded that childhood mortality increased after the war and under sanctions in the south/centre, but began to decline in the north after OfF began (Ali and Shah 2000).

Malnutrition among children under five, which rose during 1991-6, has declined throughout the country, especially since 2000. In general social indicators in the north have improved much more rapidly than the centre/south since OfF implementation, and are overall better than ever.

Meanwhile the psychological impact of war, its aftermath and another possible conflict continues to damage mental health. Adults who may hardly have recovered from their experiences of the 1990-1 war and uprisings, and the suffering caused by direct experiences of conflict, bereavement and losses, now face chronic stress from the further threats. Women, especially those bringing up children alone or lacking family support, and children already living in poor circumstances, disabled or lacking strong family support are most vulnerable to emotional disturbance. The experience of another war is likely to magnify psychological disturbance already present in adults and children.

The 1990s saw a decline in schooling. Lower literacy, especially among females, has a known negative impact on health. Before 1990 Iraq was among the forefront of Arab countries promoting education and employment for women, but this has reversed. Widowhood through war, deprofessionalisation, rising unemployment and widening education differentials have all damaged women's status and prospects. The decline is particularly acute in rural areas, where the almost extinct phenomenon of marrying preadolescent girls has returned. All these factors contribute to a worse state of health for women and a rise in infant mortality and morbidity.

Iraqis who have jobs suffer from much more occupational ill health, including accidents and illness. Many work in the informal economy which has few safeguards. Dangerous occupations such as sex work and smuggling have expanded, while social welfare has diminished. Common sights such as children working, begging or living on the streets were rare before the war.

The health sector had greatly deteriorated before OfF, which brought better access to medicines although essential drugs and equipment are still often lacking. Conceptually, too, the health sector was ill equipped to cope with the new demands, and has only slowly begun to shift towards primary health care and public health service to respond to the challenges.

Conclusion

The health of the Iraqi people, previously reasonably good despite life under a brutal regime, suffered enormously from the combined impact of the war and sanctions, and has not returned to prewar levels. OfF has enabled some improvement in recent years, particularly in the north. Overall health remains poor and any new conflict would hit people extremely hard. The baseline of well-being is far lower than in 1991 and the impact would be worse even if an identical war scenario were played out.

The impact of the war on other countries

The war and its aftermath triggered economic crises and political/social unrest whose effects on health and the environment of Iraq's neighbours, the Coalition and developing countries were sometimes profound and are still felt today.

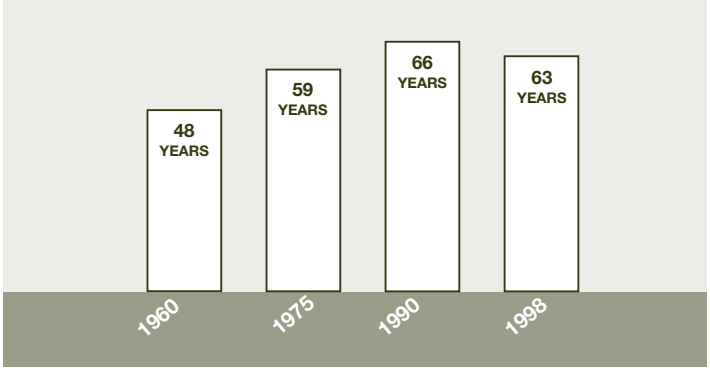
The Iraqi invasion of **Kuwait** caused relatively few casualties but the firing of hundreds of oil wells by Iraq was an environmental and economic disaster whose effects were felt as far away as **Hawaii** and the **Himalayas**. Clean-up and reconstruction cost $150-200bn. **Iran**, **Turkey**, **Jordan** and to a lesser extent **Saudi Arabia** had massive influxes of refugees. **Jordan** lost $32bn worth of trade, tourism, aid and remittances (Gulf Information Project 1994).

Officially there were fewer than 500 dead and 500 injured combatants from the Coalition countries but the figures are strongly contested and many more war-attributable deaths must be added in the longer term. The longer-term impact on veterans of exposure to depleted uranium and other toxins is difficult to quantify, as is the extent of Gulf War Syndrome, said to affect over 25,000 **US** and **UK** veterans. A third of Gulf War veterans experienced post-traumatic stress disorder.

Coalition countries probably spent around $82bn (in today's dollars) on the war, the main contributors being **Saudi Arabia**, **Kuwait**, **Germany** and **Japan**. Most of the **US** expenditure was reimbursed by its allies (O'Hanlon 2002b). The war cost the **UK** $3.96bn, of which $1.79bn was recouped in pledges and insurance (National Audit Office 1992).

The reduction in growth caused by the doubling of oil prices had the greatest impact in **developing countries**. The effects exceeded 1% of GNP in at least 40 of them, reaching the UN threshold for eligibility for disaster relief. Resettlement costs and loss of remittances from migrant workers, export earnings, tourism and aid all exacerbated the immediate damage (Overseas Development Institute 1991).

TABLE 4 **Average life expectancy in Iraq 1960-1998**



Source: UN

a new Gulf War: the **real**

War on Iraq could have a devastating impact
of combatants, Iraqi civilians and people in n
on the environment of Iraq and on the rest o

CASUALTIES

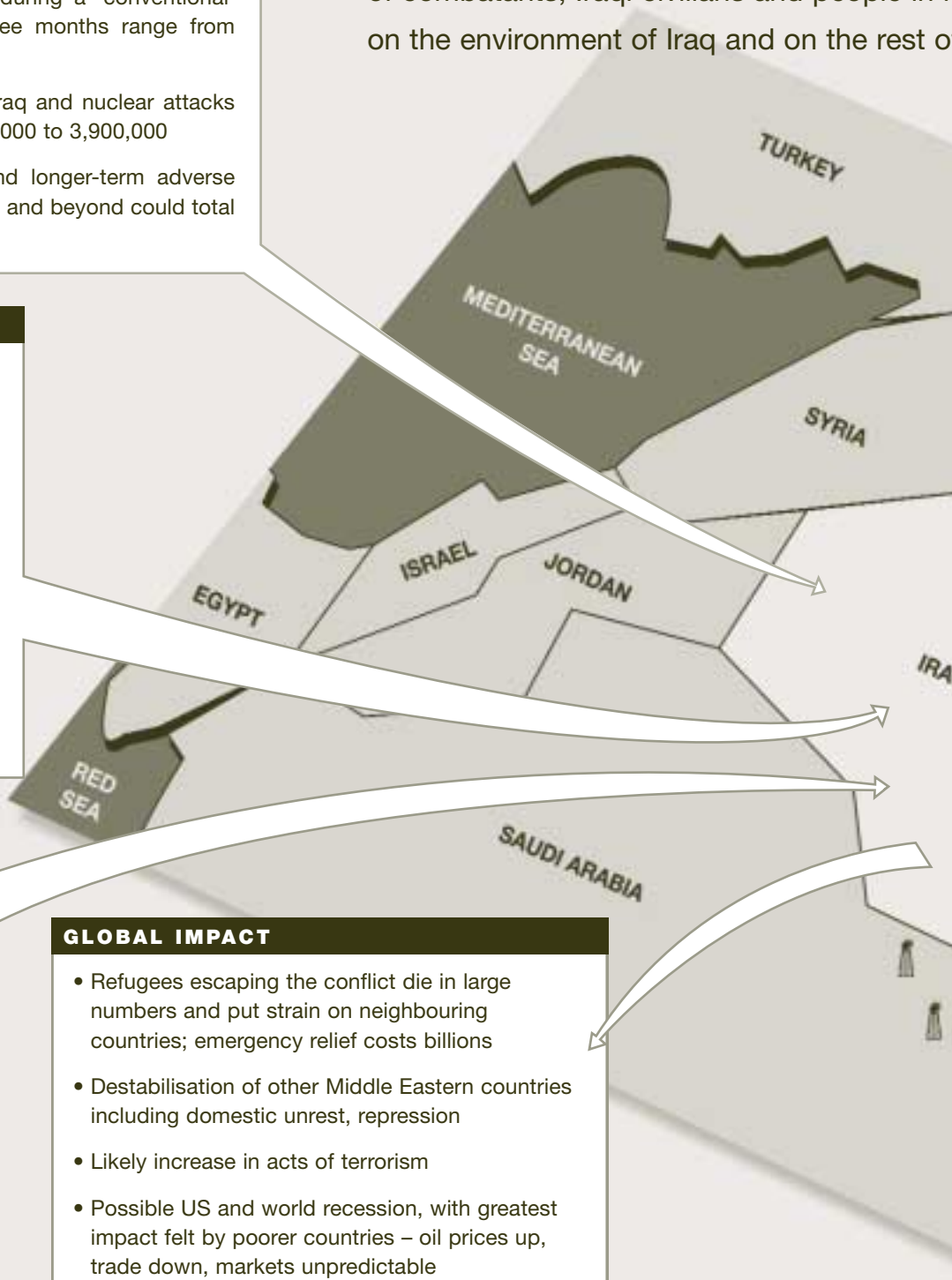
- Possible deaths on all sides during a 'conventional' conflict and the following three months range from 48,000-261,000
- If civil war breaks out within Iraq and nuclear attacks are launched, the range is 375,000 to 3,900,000
- Deaths from other indirect and longer-term adverse health effects of the war in Iraq and beyond could total an additional 200,000

THE WEAPONS

- War, sanctions and UN weapons inspections have reversed and retarded but probably not eliminated Iraq's chemical, biological and long-range missile capacities
- The US has developed and stockpiled many new weapons of all kinds, such as earth-penetrating nuclear missiles known as 'bunker busters'

THE ENVIRONMENT

- Widespread damage to the environment of Iraq and possibly neighbouring countries
- Oil wells fired, creating oil spills and toxic smoke
- Troop movements and landmines destroy fragile desert ecology
- Bombardment destroys cities and topsoil
- Chemical, biological and possibly radiological pollution of land, sea, rivers, atmosphere



GLOBAL IMPACT

- Refugees escaping the conflict die in large numbers and put strain on neighbouring countries; emergency relief costs billions
- Destabilisation of other Middle Eastern countries including domestic unrest, repression
- Likely increase in acts of terrorism
- Possible US and world recession, with greatest impact felt by poorer countries – oil prices up, trade down, markets unpredictable
- The cascade effect: from the effect on an individual combatant to the effect an injury on one combatant has on other combatants, to their families, to their community, to society in general and then to the state and internationally

All information drawn from
Collateral Damage: the hea
costs of war on Iraq, Meda

cost

t on the lives and health
eighbouring countries,
f the world.

A COUNTRY IN RUINS

- Iraq's infrastructure, already seriously damaged by the earlier war, will suffer enormous damage in initial air attacks and subsequent urban conflict
- The destruction of roads, railways, homes, hospitals, factories and sewage plants will create conditions in which the environment is degraded and disease flourishes
- Shortages of water, food, and energy resources lead to epidemic diseases that may result in more deaths than those caused directly by the conflict

HEALTH OF IRAQIS

- Humanitarian catastrophe engulfs already weakened and unhealthy Iraqi civilians – refugees, displaced persons, war-wounded, vulnerable groups especially young children
- People suffering from the immediate impact of war are more susceptible to further health hazards and less able to mobilise their own resources for survival and reconstruction
- Physical health effects include disability, infectious diseases, stillbirths, underweight new-borns, diseases of malnutrition, possibly more cancers
- Mental health effects include post-traumatic stress disorder, long-term psychiatric illness, behavioural disturbance
- Health services, already running well below capacity, cannot cope with immediate demands or offer longer-term rehabilitation or preventive health care

FINANCIAL BURDENS

- All sides will pay a heavy financial cost, including arms spending, cost of subsequent occupation of Iraq, relief and reconstruction, possibly exceeding $150-200bn
- The US is likely to spend $50-200bn on the war and $5-20bn annually on the occupation
- Total economic collapse in Iraq
- A projected war cost of $100bn would fund about four years of health expenditure to address the health needs of the world's poorest people

references cited in
lth and environmental
ct, London, 2002.

Chart adapted with permission from one on pp 18-19 of the *New Internationalist*, No. 236/October 1992.

The likely war scenario

Various war scenarios have been proposed in recent weeks, ranging from assertions that the immediate damage will be no greater than that of the war on Afghanistan (where the immediate death toll was less than 5000) to predictions of a nuclear holocaust.

Sensible assessment of the impact of an attack on global health and environment must be based on a credible hypothetical scenario. This report, rather than setting out a range from best to worst case, focuses on what is most likely to happen, as described by Rogers (2002a, 2002b), Gordon et al (2002) and O'Hanlon (2002a, 2002b). These predictions are based on government reports and other reliable, non-partisan military and political sources in the public domain. Recent estimates of Iraqi capabilities are also drawn on (IISS 2002, 'Blair dossier' HMG 2002).

Whatever broader objectives are proposed or assumed, the avowed aim of a US attack on Iraq has changed from containment to the replacement of Saddam Hussein, in other words 'regime change', or at least 'leadership change'. The conflict will therefore be much more intense and destructive than in 1991, as well as using new, more deadly weapons developed in the interim. Military action against the regime has already begun in the form of air strikes, a regular occurrence over the no-fly zones since 1991 and stepped up in recent months. Forces and military infrastructure are rapidly being built up in the US and its bases in Turkey, Qatar, Kuwait, and on carrier battle groups in the Gulf, and manufacture of weapons and protective clothing is accelerating.

US military strategy, whether partnered by the UK and others or going it alone, comprises four main elements – not necessarily in sequence (Rogers 2002a, 2002b). The optimum time to go to war is the winter, aiming to complete operations before the searing Iraqi summer; recent diplomatic manoeuvres mean war is unlikely before the new year.

(1) There will probably be a series of sustained and devastating air attacks on all the main facilities that enable the regime to maintain its survival, including government ministries; air defences; air force and army bases; command, control and communications facilities; any manufacturing facility that has a defence connection; the national electricity supply system; transport; fuel storage; administrative centres; and all other civil activities with a war-support element. The targets will be located not only in Baghdad, but in other cities where Saddam's military assets and elite forces have already been dispersed and disguised.

Cruise missiles, stealth bombers, strike aircraft and B-52 bombers would be used, the latter probably operating from the UK. This will follow the pattern developed in the Gulf War and also used against Serbia and, to some extent, Afghanistan. Precision-guided conventional weapons will be supplemented by specialised weapons designed to destroy electricity supply networks and computers. In addition, area-impact munitions, designed to damage and destroy 'soft' targets including people, will cause substantial damage.

(2) The second element of the campaign will probably be the landing of ground and amphibious forces to seize the oil-producing region around Basra and the south-east, cutting the regime off from its most important oil supplies. Heavy bombardment and fierce combat are likely.

(3) US and allied troops will attempt to acquire and maintain control of the Kurdish region of North Iraq. Preparations started early this year with US military engineers repairing and upgrading at least three airfields there to operate a range of attack and transport helicopters and aircraft. The base at Zakho is within 200 km of the major northern oil fields, including the important ones around Kirkuk. There are around 5000 troops in the region, including Turkish army brigades as well as US special forces. These operations may possibly be paralleled with forces inserted into the western desert from Jordan. Both actions, in south and north, are likely to be opposed by the regime; massive and continual use of air strikes to limit US casualties would cause many civilian deaths and much damage. The US has made agreements with Kurdish leaders to ensure the local militias' support, but civil war could erupt in these anarchic conditions, as well as Turkish incursions.

(4) After the major part of the air war and after the regime is cut off from its oil, rapid deployment forces would move towards Baghdad, to force the regime to commit its elite Special Republican Guard and other units to the city's defence. This would expose the Iraqis to ferocious air attacks with precision-guided munitions, carpet bombing and area-impact munitions. Many of the 375,000-strong Iraqi army are ill-equipped, ineffective and probably unwilling to fight, and will largely be left alone, to form the

basis of a peacekeeping force under a new regime.

As in the 1991 war, many of the 80,000 reliable core troops will be held back in Baghdad to fight for 'regime survival', Saddam Hussein's primary goal. They probably depend on regime survival for their own long-term well-being. They may be dispersed among the sprawling urban areas of the city, making occupation extremely difficult without causing numerous civilian casualties among its five million people. Even ordinary Iraqi citizens who might desire the end of the regime may be unwelcoming to foreign invaders in the aftermath of air attacks that have taken innocent lives and wrecked homes and schools. Their non-cooperation with the invaders could prolong the fighting.

The US hope is that within days Iraqi military communications will be defunct, the regime will be cut off from its oil supplies, and Saddam's elite forces will be disintegrating; and that the regime will be finished within weeks and replaced by an acceptable leadership. Even if this 'best case' occurs, damage to health and the environment will be massive and the effects will be felt by ordinary people for months and years to come. Furthermore, although the regime faces overwhelming military opposition, it has a number of options available that could cause further harm. It may seek to make the war as difficult and protracted as possible, even allowing US troops into Baghdad to maximise US casualties and increase political pressure for a withdrawal. All the following options are possible, and most will probably be used if the regime survives the initial onslaught and is cornered.

- Selective use of chemical and biological weapons, which will force US troops to fight in cumbersome protection suits.
- Destruction of oil fields, firing oil wells and possibly using radiological or chemical missiles to pollute the sites.
- Paramilitary attacks on Kuwaiti and Saudi oil fields, pipelines and facilities and possibly transit routes such as the Suez Canal.
- Paramilitary attacks on civilian centres in Kuwait, Saudi Arabia, and other Gulf states.
- Paramilitary attacks on targets in the US, UK and other Coalition countries (some health professionals in the UK and US are to be vaccinated against smallpox in anticipation of such action).
- In extreme circumstances where the regime faces its own termination, more substantial use of chemical and biological weapons including targeting of US bases in north Iraq, Qatar and Kuwait, and perhaps Israel, in the latter case instigating nuclear counter-strikes. Ariel Sharon has already expressed his readiness to retaliate and the UK has not ruled it out: 'In the right conditions we would be willing to use our nuclear weapons,' defence minister Geoff Hoon said in March 2002.

Even if this scenario is not played out in full, it suggests that a short, clinical campaign to effect regime change is wishful thinking. 'This will not be another Vietnam or Korea, but casualties could be significantly greater on all sides than in the 1991 Gulf War,' says Michael O'Hanlon, senior fellow in foreign policy studies at the Brookings Institution. 'To count on an easy victory...is unsupported by the available evidence and by the methodologies of combat prediction' (O'Hanlon 2002b). A war against Iraq carries formidable risks: it could result in substantial civilian casualties and lead to the use of weapons of mass destruction. If the regime does not collapse quickly, scenarios become increasingly risky and less easy to predict or control. As Tony Blair notes in his 'dossier' *Iraq's Weapons of Mass Destruction* (HMG, 2002), 'In today's interdependent world, a major regional conflict does not stay confined to the region in question.'

Many questions remain unanswered about the aftermath and the likelihood of installing a stable new regime. The current problems of Afghanistan provide a reminder of the huge investment required to rebuild a shattered country and lay new foundations of democracy and justice, and the reluctance of the global community to support such long-term development. Scholars note the fractured nature of Iraqi society; Jabar predicts that the demise of the regime, however welcome, 'will unleash latent, uncontrollable institutional and social forces besides which fantasy will pale. The very removal process may well prove too costly, or degenerate into chaos' (Jabar 2002). Civil war is a real possibility, exacerbating the economic and social collapse triggered by the war, displacing yet more people and leading to famine and many deaths. The already volatile Middle Eastern and Central Asian regions could be further destabilised, stirred up by further paramilitary action supported by many who will resent 'Western control', and increasing the likelihood of terrorist attacks on western targets.

The developed world may pay heavily for the war, not only in the direct costs of war, aid and reconstruction, but through the recession that the war could precipitate. Soaring oil prices are likely to have harmful effects on already fragile stock markets. This in turn would have a calamitous impact on the economies of developing countries.

Health and the environment

What follows is an attempt to assess the impact of the war using the aforementioned scenario. Calculations are based on evidence from previous conflicts with comparable aspects such as the 1990-1 Gulf War, Panama, Lebanon, Chechnya, Mogadishu and the former Yugoslavia, and on military simulations.

Air attack:

Massive bombardment of all facilities and infrastructure that contribute to regime survival, in Baghdad and other cities. The potential impact on health and the environment is: Immediate casualties, dead and injured, combatant and civilian, including victims of new weapons such as 'bunker busters' (Sidel et al, 2002). Release of chemical, biological and possibly radioactive pollutants from bombing Iraqi weapons facilities, if US/UK allegations of stockpiling prove true. A public health crisis arising from huge infrastructure damage, including severe and possibly deliberate damage to an already weak medical infrastructure – shortage of water, food, and energy resources, lack of access to medical supplies and treatment: 'epidemic dieases may then result in more deaths than those caused directly by the conflict' (BMA 2001).

TABLE 5 Possible human cost of war on Iraq

Direct conflict casualties in/soon after conventional war	
Baghdad:	
Iraqi combatant deaths [1]	2000 - 50,000
Iraqi combatant wounded [1]	6000 - 200,000
Iraqi civilian deaths [1]	2000 - 50,000
Iraqi civilians wounded [1]	6000 - 200,000
Coalition combatants deaths [1]	100 - 5000
Coalition combatants wounded [1]	300 - 20,000
Additional deaths if CBW used [2]	410 - 21,000
Basra, Diyala, Kirkuk, Mosul [3]:	
Iraqi combatant deaths	1200 - 30,000
Iraqi combatant wounded	3600 - 120,000
Iraqi civilian deaths	1200 - 30,000
Iraqi civilians wounded	3600 - 120,000
Coalition combatants deaths	60 - 3000
Coalition combatants wounded	180 - 12,000
Additional deaths if CBW used	246 - 12,600
Within three months of end of conventional war	
Iraqi civilians [4]	4,000 - 6,000
Iraqi civilian deaths in civil war [4]	20,000
Refugee deaths [4]	15,000 - 30,000
Children under 5 excess deaths [5]	23,500
Nuclear attack on Baghdad only	
Deaths 306,600 - 3,608,000 [6]	

The total of possible deaths on all sides during the conflict and the next three months, excluding civil war within Iraq and nuclear attacks, ranges from 48,716 - 261,100. When the latter two scenarios are included the total range is 375,316 to 3,889,100. Both ranges exclude deaths from other indirect and longer-term effects of the war in Iraq and beyond. Additional deaths from postwar adverse health effects could total 200,000.

Sources

1 O'Hanlon 2002a, 2002b
2 O'Hanlon 2002b – CBW death toll an additional 10-20%
3 Based on conservatively estimated combined city population of 3m, extrapolated from Baghdad estimates
4 Based on 1991 UN figures
5 Ascherio (1992) figure for Jan-Aug 1991, halved
6 Extrapolated from Ramana, 1999

Grab the oil:

Invasion of south eastern Iraq to seize the oil fields around Basra. The potential impact on health and the environment is: Heavy combatant and civilian mortality and morbidity. Possible sabotage of oil wells polluting the environment and damaging health. Restricted imports of food and medicines leading to malnutrition and preventable disease and eipdemics.

Secure the north:

Invasion of northern Iraq to seize oil fields and secure Iraqi Kurdistan. The potential impact on health and the environment is: Possible heavy combatant and civilian mortality and morbidity, depending on whether the regime attempts to retake the north and whether it is prepared to use chemical and biological weapons. Internal conflict, perhaps exacerbated by Turkish and Iranian interests, could arise in anarchic conditions between rival groups whose history of co-operation is poor, and in an area where terrorist groups are already active. Sabotage of the northern oil fields would cause health and environmental damage.

The Battle for Baghdad:

Air strikes, and troop advances from south, north, perhaps west; fierce combat with Republican Guard. The potential impact on health and the environment is: Military losses on both sides: 2,000-50,000 Iraqi deaths, between 100 and 5000 US/other deaths and three to four times that number wounded. (O'Hanlon 2002, drawing on parallels with US action in Panama and Mogadishu). A US 'war game' earlier this year reported in the *Wall Street Journal* found that 980 Marines dislodged 160 enemy troops for the loss of 100 US troops; this 6 to 1 US numerical advantage could be reversed, suggesting much heavier US losses (cited in Peterson 2002). Urban wars in Beirut and Grozny

also offer comparisons. When the Israelis besieged West Beirut in 1982, they faced 15,000 lightly equipped Palestinian militia; the Israelis lost 250 troops but used so much firepower that at least 20,000 Palestinians and Lebanese died, mostly civilians. In Grozny the Russians could not easily overcome Chechen resistance; the city was reduced to rubble, and over 2000 Russian soldiers and tens of thousands of civilians died. Iraqi civilian losses in Baghdad could reach 10,000.

Saddam's last stand:

Use of chemical and biological weapons (CBW) within and beyond Iraq. Could increase US casualties by 10-20%, and harm Iraqi combatants and civilians.

Attacks on Gulf oil and civilian centres; attacks on US, Europe and other Coalition countries via paramilitaries. Recent terrorist attacks have caused anything from a handful of deaths to the 3,000 who died as a result of the September 11, 2001 attack.

Meltdown:

CBW strikes on Kuwait and Israel. Israel, possibly US and UK strike back – perhaps with nuclear weapons. The potential impact on health and the environment is: Unpredictable owing to the very large number of variables, but presents many serious threats to mental and physical health and the environment in both short and longer term. A Hiroshima-size nuclear fission bomb on Baghdad could kill 66,000 – 360,000 people, while a modern-day thermonuclear bomb could kill 306,000 – 3,608,000 (figures extrapolated from Ramana's study of a hypothetical nuclear attack on Bombay, 1999), excluding long-term deaths and other effects.

The aftermath:

In Iraq: possible civil war, famine and epidemics, millions of refugees and displaced people, effects on children's physical and mental health and development experienced into the next generation and hindering future reconstruction, economic collapse including failure of agriculture and manufacturing, and long term peacekeeping.

In the wider world: global economic crisis through trade reduction and soaring oil prices with particularly devastating consequences in developing countries, destabilisation and possible regime change in neighbouring countries. The potential impact on health and the environment is: enormous and impossible to quantify. Five leading UK aid agencies working in Iraq or the wider region estimate that military action could cause a humanitarian catastrophe (*The Guardian*, 2002).

Conclusion

The Iraqi people's mental and physical health and well-being were seriously harmed by the direct impact of the 1990-1991 war. They were further weakened by the indirect effects of the conflict in a variety of ways that stem from the consequences of economic collapse, and from widespread infrastructural destruction and damage to services and facilities such as food production, energy supplies and health care that are key influences on morbidity and mortality.

In the ensuing decade, the continuing imposition of sanctions on Iraq led to further dramatic damage to health and well-being and an acceleration in social decline. The no-fly zones enabled faster recovery in the north but US and UK air strikes damaged health and the environment. OfF, the world's largest relief programme, prevented humanitarian disaster and health and social indicators began to improve throughout Iraq from late 1997, especially in the Kurdish autonomous region. However, OfF has institutionalised a state of crisis and has not prevented serious violations of rights to food, education, employment or health care – all factors that impact on health – and now faces a funding shortfall. While the economy has picked up in the last three years, it is not clear how widely the impact of recovery is felt beyond the million-strong elite surrounding the regime.

The most probable scenario for the threatened war on Iraq was outlined as a basis for estimating its likely impact on health and the environment. It cannot be emphasised too strongly that even a 'best-case' scenario of a limited war of short duration, perhaps comparable to 1991, would have much greater impact on the Iraqi people and would initially kill three times the number who died on September 11. Except the elite, protected by wealth and privilege, most of those who have survived were much healthier mentally and physically in 1990. They are now far less able to withstand further assaults on their health, suggesting an exponential growth in the potential harm.

The Gulf War also triggered extensive damage to the environment of neighbouring countries, and to the health and well-being not only of coalition combatants but also of civilians in neighbouring countries and in developing countries hit by its negative impact on trade. Estimates of how a new war might damage the global economy, and thus indirectly harm the health and well-being of millions

more people, are speculative but none the less serious for being hard to gauge.

Some argue that the continued negative health effects of the regime must be traded off against the short-term effects of a war. The brutal dictatorship of Saddam Hussein undoubtedly damages health in many ways, from direct action such as torture and execution to worse physical health and the mental and physical decline associated with living in fear. The regime's failure to comply with UN resolutions, thus undermining the case for easing sanctions, and its hindering of the implementation of OfF by manipulation of oil supply and failure to agree on oil pricing, also lays further serious health effects at its door. It appears, however, that the slow but perceptible improvement in health since 1998 might continue under present conditions. It cannot be argued that 'doing nothing' would necessarily damage health, and it might even help it to improve.

Furthermore, and most importantly, in spelling out the massive death and destruction a war would probably cause both directly and indirectly in Iraq and the rest of the world, this report is not making a case for 'doing nothing'. Neither is it concerned with apportioning blame. It argues that in assessing how best to tackle this dangerous regime and work towards democracy and social justice for all, the true cost of war must be calculated and widely debated. If the war is likely to cause worse problems than those it sets out to solve, then it is ill-advised under any circumstances, and other options must be explored.

The many options on the spectrum between 'doing nothing' and going to war against Iraq have by no means been exhausted (Elworthy and Rogers 2002; Forrow et al 1998; Garfield 1999b; Jabar 2002). As this is a factual report produced by health professionals, it is not appropriate to weigh the options and express a preference here, but we commend them for further consideration. In any case a situation of such complexity and delicacy needs to be approached in a variety of ways that are mutually reinforcing and synergistic.

Actions relating specifically to Iraq:

- Target smart sanctions at the Iraqi elite that keeps the regime in power.
- Allow time for weapons inspections to work and ensure they are conducted objectively as well as thoroughly.
- Create a visible and credible containment system to restrict the flow of weapons-related goods into Iraq.
- Improve humanitarian conditions through more effective and equitable operation of OfF, introducing a longer-term focus on development to complement the current short-term focus on commodity distribution.
- Develop meaningful political processes to disengage the various components of the Iraqi regime from each other.
- Encourage the growth of a democratic and inclusive civil state.
- Create a mini-Marshall Plan for Iraq to encourage the post-Saddam rule of law.

Actions to improve international security:

- Support steps to reduce the global arms trade (in the UK, for example, the arms trade is the second biggest export earner – BMA 2001) and the development and stockpiling of weapons by all countries.
- Enforce and extend international agreements on disarmament, including removal of all nuclear missiles from high-level alert status and eliminating the possibility of rapid launch.
- Prevent terrorist use of weapons of mass destruction by placing stocks of fissile materials under comprehensive international safeguards, tightening border controls in conjunction with weapons inspections, and encouraging closer co-operation between intelligence agencies.
- Work through the UN to tackle the roots of Middle Eastern problems, including a just and fully enforced Israeli-Palestinian settlement.
- Offer greater support to democratic movements in Iraq and elsewhere.
- Target self-help development assistance to help eradicate the conditions in which dictatorship can flourish.
- Increase funding for effective interventions for physical, political and psychological security that break the cycle of violence (these currently receive less than 1% of the funds available for military intervention – Elworthy and Rogers 2002).
- Maximise ability of health professionals to be involved in building 'health bridges for peace'.

Overarching all these proposals is an urgent need for humane and wise global leadership which recognises that national security is impossible without international security – and that this can be achieved only by the measures outlined above. Medact and IPPNW call on those concerned to make the 21st century a safer era by pursuing peaceful means of resolving conflicts with Iraq, and to think carefully about the effects of waging a war that might damage our fragile planet and its people for decades to come.

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This evidence-based report analyses from a public health perspective the health and environmental impact of the previous, ongoing and any future conflict with Iraq,

It shows that waging war on Iraq would have enormous humanitarian costs, including disaster for the Iraqi population in both the short and long term, and would create enormous harm further afield to combatants and civilians alike. It concludes by summarising alternatives to war.

The report is by Medact, an organisation of health professionals that exists to highlight and take action on the health consequences of war, poverty and environmental degradation and other major threats to global health. For many years the organisation has highlighted the impacts of violent conflict and weapons of mass destruction and worked to improve the health of survivors of conflict such as refugees.

Medact's overarching conclusion is that war is a major hazard to health and prevention must always be better than cure.

Medact is the UK affiliate of International Physicians for the Prevention of Nuclear War (IPPNW) and shares the federation's core message of strong opposition to a war or military intervention in Iraq.

This report, and also an extended version of it with additional references, can be found on Medact's website www.medact.org and on the website of IPPNW www.ippnw.org.

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