Propaganda or science? Biological warfare and the people of Iraq

In the months leading up to the Anglo-American attack on Iraq, there was a plethora of reports in leading biomedical journals about biological weapons and bioterrorism. The coverage seemed out of proportion to the public health importance of bioterrorism, which has claimed only a small number of lives worldwide. In 2002, there were many more articles on bioterrorism than there were articles on road traffic crashes, which kill 3000 people each day worldwide.[1] Before the war, opinion polls showed that most people in the United Kingdom opposed the launching of a military attack on the people in Iraq. To have supported the war, the public would have needed to believe that they were being attacked. Although there is no reason to suspect that this was a deliberate attempt to alarm the population, nevertheless the large number of articles on bioterrorism may have had this effect.[1] To this end, medical journals may have played an important political part in justifying war in Iraq.

Now that the military attack is over—and much of Iraq's public health infrastructure reduced to rubble and a large proportion of Iraqi homes and hospitals left without clean water supplies—it is important to consider more carefully what is meant by the term biological warfare. I would argue that the concepts of bioterrorism and biological warfare, as used by most medical journals, are biased in that they refer only to those forms of biological attack to which the United States and the United Kingdom are considered vulnerable. However, medical journals have an obligation to take a scientific, non-partisan approach to biological warfare.

The only property of micro-organisms that enables them to be used as biological weapons is their capacity to cause infectious disease. People may be deliberately exposed to pathogenic micro-organisms in a variety of ways, but it is the fact of exposure rather than the method of delivery that determines whether disease will result. Because the ability to cause infection is the defining aspect of a biological weapon, then any malevolent intervention that causes infection in the civilian population constitutes an attack with a biological weapon.

However, micro-organisms are necessary, but not sufficient, to cause infectious disease. Other causal factors are required for infection to occur.[2] For example, host resistance is an important factor[3]: whether or not exposure to a micro-organism causes disease depends on whether or not the exposed individual is susceptible or immune. Dietary deficiency of key vitamins and micronutrients increases susceptibility to a number of infectious agents and also increases the likelihood that infectious disease will result in severe illness and death. Vitamin A and zinc deficiency in particular impair the ability of the immune system to fight infection and the ability of mucous membranes to resist infection.[3,4] Indeed, the decline in the incidence of infectious diseases in high-income countries is more readily attributed to increased host resistance from better nutrition than to a reduction in the virulence of the relevant micro-organisms. It follows that any malevolent intervention that impairs the ability of a civilian population to resist infection constitutes biological warfare.

From an epidemiological perspective, causation and prevention are two sides of the same coin,[2] and in public health practice, prevention involves removing one or more of the components in the chain of causation leading to disease. For example, following an attack with anthrax, spores can be washed off with soap and water, and oral antibiotics can be given to prevent infection from developing.[5] However, if an anthrax attack occurred in situations where antibiotics were unavailable, then some cases of anthrax infection would be attributable to their absence. Consequently, any malevolent intervention that destroys a population's ability to respond effectively to infectious diseases constitutes a biological attack.

These considerations have important implications for how biological warfare is defined in the context of the current situation in Iraq. Standard texts on biological weapons will point out that three factors must be taken into account in selecting a biological agent for a bioterrorist attack: ease of manufacture, stability, and lethality. Despite widespread public concern about the use of anthrax, smallpox, and plague, all three are difficult to manufacture and disseminate. Anthrax requires sophisticated methods of manufacture, and virulent stock is difficult to find. In addition, the only confirmed sources of smallpox are in the United States and Russia, and plague is both difficult to obtain and difficult to weaponise.[5] On the other hand, microbial agents that can cause devastating epidemics of diarrhoea are ubiquitous and can be readily disseminated if the civilian sanitation infrastructure breaks down or is destroyed. Therefore, the Anglo-American bombing of water supplies, sanitation plants, and the power plants that are necessary for their functioning, actually constitutes a biological attack. These actions will ensure that food and water supplies to the civilian population will quickly become contaminated. Because the faeces of infected persons will further contaminate the water supply and because there will be extensive person-to-person transmission, this strategy has the potential to result in extensive, population-wide, and self-propagating epidemics. The scope for civilian casualties with such an approach is massive in comparison with the use of agents such as anthrax, for which there is no evidence of person-to-person transmission.

The economic sanctions imposed by the National Security Council have caused widespread dietary deficiencies throughout the civilian populations, thereby seriously reducing the ability of the population to resist infection and constituting a form of biological warfare. Micro-organisms that pose little threat to those with intact immune systems can be lethal to those with impaired immunity as a result of micronutrient deficiency and malnutrition. For example, life-threatening diarrhoea can be caused by ubiquitous microbes, such as *Escherichia coli* residing in the gastrointestinal tract, and common respiratory viruses can cause lethal pneumonia. As a result of the sanctions against Iraq, there has been a more than doubling of the infant and under-five mortality rates, with most of the excess child mortality being due to diarrhoea and pneumonia exacerbated by malnutrition.[6] The imposition of economic sanctions in Iraq is as much a form of biological attack as was the distribution of anthrax in the United States mail system.

Furthermore, the destruction of the Iraqi population's ability to respond to outbreaks of infectious disease by restricting the importation of essential medicines and medical equipment, by destroying the public health infrastructure, and by overwhelming the capacity of the health care system to respond effectively constitutes a further biological attack.

The full extent of the civilian casualties resulting from the ongoing biological attack on the people of Iraq will become clear in the coming weeks and months, long after the world's media have lost interest. An effective humanitarian response must be mounted urgently to reduce the death toll from this shameful episode in the history of biological warfare.

(The original version of this article has been circulated on the WAME listserv.)

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I. The value of flexible sigmoidoscopy for patients with bright red rectal bleeding

A	1. False	2. True	3. True	4. False	5. True
B	1. True	2. False	3. True	4. True	5. False

HKMJ 2003;9:179-85

II. Antithrombotic treatment of atrial fibrillation in a regional hospital in Hong Kong

A	1. True	2. True	3. True	4. True	5. True
B	1. False	2. True	3. True	4. False	5. False