

War and Disease: War Epidemics in the Nineteenth and Twentieth Centuries

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Two motives lead men to War: instinctive hostility and hostile intent.

The political objective is the original motive of War.

Vom Kriege,
Carl Marie von Clausewitz, 1832

Introduction

War begets disease, particularly epidemic disease, and these two ancient human disasters remain immutably linked even as the twenty-first century unfolds. This paper will explore the disease and warfare dyad, describe the underlying mechanisms linking the two, provide narratives of significant nineteenth and twentieth century war epidemics, and discuss some bioterrorism-linked diseases.

The Prussian soldier, writer and philosopher, Carl Marie von Clausewitz (1780 – 1831) published a *magnum opus* entitled *Vom Kriege*, On War. In this posthumous 1832 publication, the first modern treatise on the philosophy and science of warfare, Clausewitz defined war simply as:

'an act of violence intended to compel our opponent to fulfil our will'.(1)

In the fifth century BC, with allied land and sea forces, the two Greek city-states, Athens and Spartan, engaged in a 27 year, three-phased continuous war from 431 BC to 404 BC, the Great Peloponnesian War. The world's first contemporaneous historian, Thucydides (ca 460 BC – ca 400 BC), wrote a lucid but incomplete account of that conflict ending his narrative in 411 BC. The soldier-historian Xenophon in his memoirs, the *Hellenica*, completed the history to 404 BC. During the same century, a Chinese soldier and military adviser, Sun Tzu, in ca 473 BC, wrote a handbook of thirteen chapters translated as *The Art of War*. This highly regarded pamphlet-guide of the stratagems of ancient warfare, yet still pertinent to modern times, Sun Tsu proposed another idea on war:

'all warfare is based on deception'. (2).

The root of the English word, 'war', is the Old High German word, *werra*, meaning 'to confound', curiously resonating the dictum of Sun Tzu. Epidemic is the conjunction of the Greek *epi*, 'upon', 'near' and *demos*, 'people', and signifies a disease concurrently affecting a large number of people. Heraclides of Tarentum (Taranto in Southern Italy) ca 70 BC, wrote a book entitled *The Soldier*, although a recipe collection of plants and drugs, it was the first treatise devoted to modern military medicine.

Kohn itemised some 2,000 wars, revolutions, rebellions and pacifications during the last four thousand years in his *Dictionary of Wars* (3) and in the six decades since World War II (1939-45), there have been no less than 350 wars, revolutions and coup d'état throughout the world (4). Mankind's urge and willingness to wage war may be a species specific characteristic of *homo sapiens*. The extent and severity of bad outcomes upon the combatant and non-combatant cohorts, so-called 'collateral damage', within the warfare of modernity were realised late in the historiography of war. The devastatingly brutal day-long battle around the village of Solferino, Northern Italy, in 1859, between France and Austria, provoked widespread controversy throughout Europe. Five years later the foundation of the Red Cross and the establishment of codified laws of modern war occurred in Geneva. Ultimately four principles were approved as the so-called Geneva Conventions in 1949, and with the

addition of two Geneva Protocols later in 1977, provided the extant legal framework for the humanitarian operation of war.

Nineteenth and Twentieth Century War Epidemics

A seminal manuscript, entitled *Epidemics Resulting from Wars*, appeared during World War I in 1916 authored by German physician and statistician, Friedrich Prinzing (5). Prinzing coined a special term, 'war pestilences', which he reserved for: *'those infectious diseases which in the course of centuries have usually followed at the heels of belligerent armies'*. He ascribed six pestilences: cholera, dysentery, plague, smallpox, typhoid fever and (louse-borne) typhus. He later added scurvy as a seventh 'war pestilence'. He further acknowledged, *'as playing an important role in many wars, malaria, influenza, measles, louse-borne relapsing fever and yellow fever'*.

Combatants during twentieth century armed conflicts benefited from improvements to military health care delivery such as antibiotic drug therapy, immunisation schedules, anti-malarial drugs and vector control programs, military medicine and nursing, emergency resuscitation and trauma surgical techniques and many more. Prior to the twentieth century, deaths from diseases regularly exceeded other war-caused mortality. During the Napoleonic Wars the British Army suffered seven disease-related deaths for every one combat-related death. Infectious diseases have been the commonest cause of non-combatant morbidity and mortality whilst dermatoses and dental infections together cause the majority of non-combatant morbidity particularly in contemporary military deployments to tropical and warm climate areas. There is, however, one extraordinary exception: during the 1870-71 Franco-Prussian War. As a result of highly effective sanitary reforms within the army, Prussian forces suffered a greater loss of life from combat than due to infectious disease (6).

During the four month-old Spanish-American War (1898) typhoid fever accounted for 87 per cent of the total deaths from disease occurring in the assembly camps. With an overall mortality of 7.7 per cent, typhoid was the major killer of American soldiers during that conflict (7). During the Great War (1914-18), as a consequence to the development of more lethal weaponry and improvements in military medical hygiene, technologies and resources, the trend was reversed whereby the number of deaths from hostilities exceeded those from disease.

Civilian deaths in war include the effects of mass population migration and refugee movements, besieged incarcerations, concentration camp internments, war-related nutritional deprivation and famine, destruction of health infrastructure as well as the dislocation of disease-control programmes. Communicable diseases brought to the civil populace by war fugitives, prisoners of war and demobilised soldiery add to civilian death rates, whilst the disruption of wild-life habitats allows the spread of zoonotic diseases to civilians (8). From the Carnegie Endowment for International Peace, John Bates Clark, signalled during World War I that: *'the most serious human cost of war has been not losses in the field nor even the losses from disease in the armies, but the losses from epidemics disseminated among civil populations'* (9).

The greatest war-related epidemic in history, impacting multinational citizenry globally, was the *influenza A H1N1* virus infection responsible for a three-waved pandemic from March 1918. Including the approximations for Indian cases, the so-called 'Spanish Flu' is estimated to have been responsible for the deaths of between 40 to 50 million people, principally in previous healthy young persons (10). The term influenza (or the *grippe*) is derived from Italian medical writings of the 16th century which attributed the disease to the 'occult influence of heaven'. J S Oxford *et al* recently hypothesised that the pandemic commenced in the large British base camp at Etaples in Northern France during the winter of 1917 by linking overcrowding in the many large camp hospitals with, the putative sources of the virus, the camp piggeries and live geese, duck and chicken markets in nearby townships (11, 12).

The Crimean War (1853-6) was the first major war for which there are official summary data on cause-specific losses during the entire period of hostilities and for which statistical analysis can be attempted. The British Army at the Crimean peninsula were subjected to major outbreaks of several diseases, principally cholera, which incidentally also caused the death, in June 1855, of the British Commander-in-Chief, Field Marshal Lord Raglan (1788 – 1855) (13).

Within military populations over the centuries it is possible to identify several recurring aetiological mechanisms to conjunct war with infectious diseases. In the American Civil War (1861-5), multi-centred military mobilization at the commencement of hostilities and surge recruitment programs during protracted campaigns, were commonly complicated by the out-break of so-called 'eruptive fevers'. These primarily were measles, as well as smallpox, scarlet fever and erysipelas. These epidemics were the consequences of non-immune young recruits from rural areas contacting disease carriers from more urbanised areas. In particular, black troops sustained three times a higher death rate than white recruits when infected by 'camp' measles (14). Camp epidemics regularly attended the habitation of large temporary and makeshift cantonments. Historically sexually transmitted diseases have plagued both the garrisoned and active-duty armies and navies of all nations. The incidence of venereal disease, for example, in the British Army during the mid-1800s was variously reported at a steady thirty-five per cent. This high attack rate so impaired force efficiencies that specific legislations, the Contagious Diseases Act regulating prostitution, were enacted in 1864, 1866 and 1869, leading later to protracted public controversy.

Infectious Disease and Contemporary Warfare

The effect of war in promoting the emergence of new disease and the re-emerging of established diseases is well exemplified in modern times with the development of chloroquine-resistant falciparum malaria and insecticide-resistant fleas, the plague vector, during the Vietnam War (1964-73). The Korean Police Action (1950-3) witnessed the emergence of Japanese encephalitis virus and Hantavirus infections both due to the contact of at-risk soldiery and the ecological changes wrought by warfare. Hantavirus diseases also dramatically reappeared during the Bosnian Civil War (1992-5) via the same mechanism. Another example of the human invasions of an ecological jungle niche occurred in World War II with

the widespread outbreak of scrub typhus during the prolonged Burma campaign.

Likely infectious diseases associated with bioterrorism has moved ahead of the American 1942 report by Rosebury and Kabat which listed thirty-three candidate pathogens for analysis as effective biological warfare agents. That report ranked *bacillus anthracis* in its dormant spore as overall the most important agent (15). The Centres for Disease Control and Prevention (CDC), the United States federal monitoring organisation based in Atlanta, Georgia, functions as the epidemiological eye of the American Public Health system. It has ranked biological agents into three classes based on the dangers they pose. In 2005, the following diseases were classified by the CDC as Class A (easily disseminated and/or highly infectious associated with high mortality rates): anthrax, smallpox, Ebola virus, *Francisella tularensis*, *Yersinia pestis* and *Clostridium botulinum*. However, genetic engineered pathogenic micro-organisms for malevolent purposes are now an entirely practical development. Synthesised in Bio-safety Level 4 laboratories, scientists have developed a recombinant chimera of the Ebola and smallpox genomes. This *ebolapox* hybrid would result in severe haemorrhagic pustulation leading to body-wide surface blackness, 'blackpox', combined with the violent haemorrhaging characteristic of the Ebola virus. The severe haemorrhaging combined with the contagiousness of the smallpox virus can result in near-one hundred per cent fatality rates (16).

The nexus of war and epidemics, the so-called 'war-and-epidemics couplet', may not, in the view of Roger Cooter (17), have a certain straight forward relationship. He argues that most epidemics are not rooted in war suggesting, for example, that polio, tuberculosis, whooping cough, scarlet fever and diphtheria correlate poorly with war. Exceptionally, wars have occurred without epidemics. Cooter quotes Creighton's 1891 article *A History of Epidemics in Great Britain*, that during the Napoleonic Wars, typhus and other contagious disease became singularly absent from England (18). Further, although smallpox is often linked with war, it has not always been spread by it. An 1882 article by W Guy records that it is in the years of peace that the highest average death-rate by smallpox occurs (19).

Over the last few decades wars have continued to increase in number and increasingly have occurred within poor states. In the past decade poor nations, such as Afghanistan, Bougainville, the Caucasus, Cambodia, the Congo, Rwanda, Somalia, Sierra Leone, Solomon Islands, Sri Lanka and Timor Leste, to mention some, have suffered war. The authors of 'War Epidemics' outline three new themes that characterise modern conflicts. The increasing involvement of non-state organisations, with guerrillas, terrorists and rebels ranking as the principal combatants. With non-state participants there has been an associated rise in so-called 'low-intensity conflicts' such as counter-insurgencies (El Salvador) and pro-insurgencies (Angola, Nicaragua). Finally, civilians are intermingling with combatants and civilians are now viewed as legitimate targets (the Rwandan genocide) (20).

Interspersed with the epidemic adverse health outcomes from the recent major wars in Afghanistan, Iraq and Kosovo are

the attendant health fall-outs associated with the continued threat of the use of biological agents and weaponry, world energy shortages and world climate change. War between John Keegan's 'have-nots' against the 'haves', and vice versa, and increasingly by the poor alone, (21) will underpin and continue to drive the world's apparent infatuation with military conflict.

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