

## **The Military as a Disease Vector Protocol**

Title: The military as a disease vector, from the World Wars to Covid-19: A systematic review

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Abstract

With the development of communication and transportation technologies, increases in international trade, and mass population movements, chances of human-to-human transmission of infectious disease agents have increased, alongside the pressing need to understand their transmission mechanisms and develop effective responses to contain their spread. Since the onset of the current pandemic of Covid-19, significant research has been conducted on transmission patterns from epidemiological data of confirmed cases and, upon confirmation of human-to-human transmission, public-health policies such as restrictions on population movements, orders to shelter in place and social distancing have been implemented. While all these have contributed to flattening the global disease curve of Covid-19, one key transmission vector has been largely overlooked by government officials, policymakers, and scientists alike in their response to the pandemic: the role of the military. However, a rich body of literature spanning at least two thirds of a century provides evidence for the role of the military as a disease vector. Therefore, this review seeks to fill this gap by shedding light on the potential for *military-civilian transmission* and on the implications of selected features of military personnel, such as their distinct freedom of movement, for the successful implementation of Covid-19 public health policy.

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Background and Rationale:

The potential for novel human viruses to cause global pandemics has never been higher than today. With the development of technologies of communication and transportation, increase in international trade, and mass population movements - due to tourism, business, or conflict leading to mass displacement – the chances of human-to-human transmission of infectious diseases have increased substantially. The novel coronavirus is a case in point.

The disease caused by this virus, severe acute respiratory syndrome coronavirus 2 (SARS-CoV 2) or Covid-19, has spread more rapidly than the other two recent, major and deadly coronavirus diseases: severe acute respiratory coronavirus (SARS-CoV) and Middle East respiratory syndrome coronavirus (MERS-CoV).<sup>1</sup> With the first confirmed case of Covid-19 occurring in Wuhan City, China, in December 2019, at the time of this writing Covid-19 has affected over 4.9 million people and killed around 325,000 worldwide.<sup>2</sup>

In an increasingly interconnected world, understanding the mechanisms of transmission of emerging viruses is crucial to developing effective responses to contain the viral spread. In the case of the ongoing COVID-19 pandemic, early research focused on identifying transmission patterns from epidemiological data pertaining to confirmed cases. Once sufficient evidence for sustained person-to-person community spread was collected, given the state of knowledge at the time the Chinese government imposed strict travel restrictions and even the lockdown of Wuhan itself.<sup>3</sup> While the initial reaction of global audiences to these measures was mixed or even condemnatory,<sup>4</sup> as Covid-19 broke national boundaries, similar restrictions were imposed by many other countries: for instance, recent data from the United Nations indicates that 100% of global destinations now have some level of COVID-19-related travel restrictions, with 45% of destinations having partially or fully closed their borders to tourists.<sup>5</sup> Major cities including New York, Berlin and Rome, have, to varying degrees, experienced significant lockdowns.<sup>6</sup>

While steps to restrict movement have undoubtedly contributed to flattening the global disease curve of COVID-19, one key transmission vector has been largely overlooked by government officials, policymakers, and scientists alike in their responses to the pandemic: the role of the military. As an example, a recent article in the medical journal *The Lancet* discussed the threat of Covid-19 posed by international visitors from China, drawing from a model that included *civilian* airports as a key factor yet entirely omitted *military* airports<sup>7</sup>, despite the well-established presence of US military missions in Africa and the fact that their personnel is exempt from airport screening procedures and host countries' laws in most African countries.

This omission of the role of the military in the development of strategies to contain Covid-19 has significant implications for global health: for instance, the military is frequently assigned tasks that overlap those of humanitarian and medical personnel,<sup>8 9</sup> especially in times of crises during which civilians become particularly vulnerable, such as during epidemics. To illustrate the point, the province of Ontario in Canada, faced with an explosion of cases of Covid-19, many of them lethal, in long-term care facilities – about 80% of deaths in Ontario have occurred in nursing homes – has, upon finding patients unattended and homes severely understaffed, deployed the military to assist with senior care, therefore increasing the risk of infection.<sup>10</sup> Further, and as illustrated in the earlier example, in many countries throughout the world the movement of military personnel has traditionally been exempted from travel restrictions.<sup>11</sup> Therefore, the risk of military-civilian transmission of Covid-19 should be of grave concern.

Considering the rich body of literature providing evidence for military personnel as a disease vector,<sup>12</sup> especially but not exclusively given the difficulty of enforcing social isolation in crowded military bases,<sup>13 14</sup> and the dearth of attention to this issue in the research and public health policy literature, this review seeks to identify circumstances under which *military-civilian transmission* might occur, shed light on transmission mechanisms, and elaborate on the

implications of distinct features of military personnel, such as its freedom of movement, for the successful development and implementation of public health policies to contain eventually prevent the spread of Covid-19.

Review Question (s):

1. To what extent does the literature report disease transmission between military personnel and civilians? Within studies that do report this, are social or biological aspects of the transmission mechanisms described?
2. For studies that describe mechanisms of military-civilian transmission, are geographical and historical contexts described? How are they described?
3. For studies that describe mechanisms of military-civilian transmission, do they report outbreaks and their impact on civilians? What was the nature of these outbreaks and the magnitude of this impact?
4. How does the freedom of movement given to military personnel increase the spread of disease?
5. Do any studies identify and discuss whether or not movement of military personnel was restricted during outbreaks/epidemics/etc.? If so, how are these restrictions framed?

Search:

Sources: Medline (Ovid), Embase (Ovid), Web of Science

Search date: May 13, 2020

Search range: any data (published or unpublished) on the topic of the spread of disease through or within the military prior to May 14, 2020

Inclusion/exclusion criteria:

- *Inclusion:* articles describing or explaining how the military has been or is involved, promotes, or contributes to the spread of infectious diseases (bacterial, viral, parasitical, or fungal) among populations
- *Exclusion:* non-English articles, letters to the editor, conference abstracts or papers, proceeding papers

Keywords:

*Category A* (population): army, military, “naval base”, “military personnel”, navy, soldier, troops, civilian\*

*Category B* (outcome): epidemic\*, infect\*, pathogen, disease, carrier, transmission, vector, outbreak\*

Main outcomes:

1. What percentage of studies report disease transmission among military personnel?

2. What percentage of studies report disease transmission between military personnel and civilians?
3. What percentage of studies only report suspected disease spread involving military personnel, but do not confirm this transmission (e.g., using serological methods)?
4. What types of military missions are implicated in the spread of disease? To which country/countries do these missions belong to?
5. Which types of countries (low-income, middle-income, high-income) are most likely to be the setting of an outbreak connected to military missions?
6. Do the authors suggest any measures to reduce disease transmission caused by military missions? If so, which measures do they recommend?

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