



Brief Communication

No evidence of 1918 influenza pandemic origin in Chinese laborers/soldiers in France

G. Dennis Shanks^{a,b,*}

^a The Australian Army Malaria Institute, Weary Dunlop Drive, Gallipoli Barracks, Enoggera, QLD, Australia

^b The University of Queensland, School of Population Health, Brisbane, QLD, Australia

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Abstract

Laborers and soldiers from China and Southeast Asia recruited during the First World War by Britain and France have been suggested as the origin of the 1918 influenza pandemic in Western Europe. This study aimed to review the available data to better understand the sources and origins of the 1918 influenza pandemic, and clarify whether, in fact, there was an Asian connection to its onset. We reviewed official mortality lists from the Commonwealth War Graves Commission and the French Ministry of Defence for all-cause (Britain) and pneumonia/influenza (France) mortality, respectively. The results indicated that influenza mortality (estimated 1/1000) in Chinese and Southeast Asian laborers and soldiers lagged other co-located military units by several weeks. This finding does not support a Southeast Asian importation of lethal influenza to Europe in 1918.

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A curious, mild febrile disease reported among Chinese labor troops on the coast of France early in the spring of 1918... Hans Zinsser 1922¹

1. Introduction

The onset of pandemic influenza has the capacity to cause the death of untold millions, as occurred at the end of the First World War in 1918.^{2,3} Southern China and Southeast Asia have been suggested as the ecological epicenter of pandemic influenza due to the close relationship between ducks, pigs, and humans during rice cultivation.^{4,5} There is some evidence

that the 1890–92 pandemic, as well as subsequent influenza pandemics, arose in Southern China.⁶ The origin of the 1918 pandemic remains unknown despite many hypotheses, including that pandemic influenza was brought to Western Europe from Southeast Asia by soldiers or laborers recruited by Britain and France during the First World War. These Asian men began to arrive in Europe in 1916 and recruiting continued until the end of the war in 1918.^{1,7} The evidence supporting the hypothesis of an Asian origin of the 1918 pandemic is that Chinese laborers unloading ships in Marseilles were some of the first persons known to have had an influenza-like illness, which caused little, if any, mortality early in 1918. The primary source of the hypothesis is shown in the quotation at the beginning of this article. The hypothesis has recently been renewed by suggestions that what was thought to have been an outbreak of pneumonic plague in China during the winter of 1917 was, in reality, a very lethal influenza virus that then spread to Europe by 1918 through trans-shipment of Chinese laborers or soldiers.⁸ The centenary

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* Corresponding author. Dr. G. Dennis Shanks, Australian Army Malaria Institute, Gallipoli Barracks, Enoggera, QLD 4051, Australia.

E-mail address: dennis.shanks@defence.gov.au.

of the First World War has provided public access to electronic databases listing the official mortality rolls from the Commonwealth War Graves Commission and the French Ministry of Defence. Examination of these data show that relatively few Chinese and Southeast Asian laborers and soldiers in the Allied Armies of the First World War died in Europe during the 1918 influenza pandemic. Here, we have examined the epidemiology of this lethal respiratory disease to determine if there is support for the hypothesis of an Asian origin of the 1918 influenza pandemic.

2. Methods

Data used in this study were gathered from two publically accessible, online electronic databases maintained by the Commonwealth War Graves Commission (cwgc.org) and the French Ministry of Defence (memoiredeshommes.sga.defence.gouv.fr), which were both accessed in January 2015. The Commonwealth War Graves Commission records were searched for any member of the Chinese Labour Corps (CLC). French Ministry of Defence records were searched to identify laborers and soldiers originating from China, Cambodia, Laos, and Vietnam (including Cochin China and Tonkin). Weekly epidemic curves were constructed in Microsoft Excel (Microsoft Corp., Redmond, WA, USA) from daily mortality lists. Only all-cause mortality was available for the CLC, but linkage of French records to individual pension and war compensation records enabled these deaths to be parsed into those caused by pneumonia-influenza, tuberculosis, and all other causes. Information regarding all-cause deaths in the British Expeditionary Force (BEF) in France and Belgium and pneumonia/influenza deaths among French naval recruits was available from previous research.^{9,10} Denominators were estimated from the time of the Armistice in November 1918 to be 100,000 for the CLC and 90,000 for French Asian laborers and soldiers.

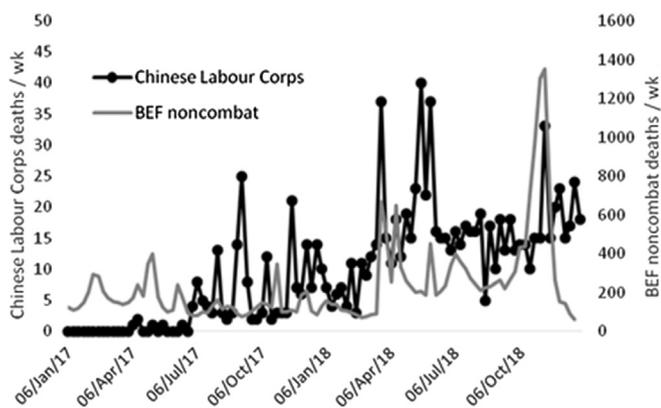
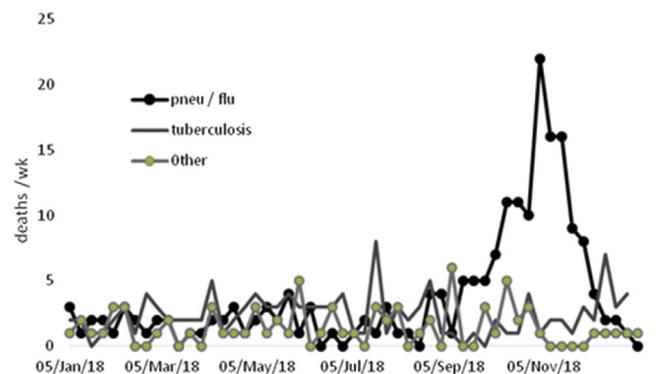


Fig. 1. Chinese Labour Corps all-cause mortality recorded by the Commonwealth War Graves Commission as compared to noncombat mortality in the British Expeditionary Force in France and Belgium from 1917 to 1918. Influenza mortality as seen in October 1918, with the preceding irregular peaks in both groups representing various non-combat deaths occurring during major military offensives in 1918.

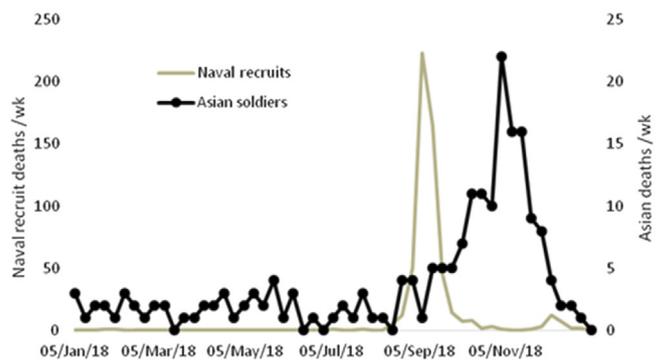
3. Results

Mortality in the CLC (which was not a combat unit) was compared to non-combat deaths in the BEF in France and Belgium (Fig. 1). In both groups, there were irregular mortality peaks during the period of March–May 1918. The largest non-combat mortality peak in the BEF occurred during September–November 1918 and was clearly due to the influenza pandemic. The equivalent peak in the CLC in mid-November 1918 occurred 1 week later than in the entire BEF. The estimated pneumonia and influenza mortality rate in the CLC after subtracting baseline mortality was 1/1000.

Prior to the influenza pandemic, French Asian laborer and soldier mortality consisted of equal numbers of deaths due to pneumonia/influenza, tuberculosis, and all other causes (Fig. 2A). A broad pneumonia/influenza mortality peak is seen from late September 1918 to early December 1918 and represents those deaths attributable to the influenza pandemic. A similar estimation process that did not require adjustment for background mortality provided the same influenza pandemic mortality rate of 1/1000 for the French laborers and soldiers as was determined for the CLC. Previous research using French Navy mortality data showed that the earliest peak occurred during naval recruit training in port cities, such as Marseilles.⁹



A



B

Fig. 2. The weekly mortality of Chinese and Southeast Asian laborers and soldiers in the French Army during 1918 (A) caused by pneumonia/influenza, tuberculosis, and all other causes and (B) as compared to similar data from French naval recruits. Note the absence of irregular mortality peaks seen in the all-cause mortality data shown in Fig. 1.

Pandemic mortality in French naval recruits peaked in early September 1918, which was 2 months earlier than the mortality peak in Asian laborers and soldiers in early November 1918 (Fig. 2B).

4. Discussion

Mortality records from the First World War were used to document the experience of both the British Army Chinese Labour Corps and French Army laborers and soldiers recruited from China and Southeast Asia. In both groups, mortality due to the influenza pandemic could be distinguished in late 1918 and was estimated at 1/1000 men. This is a relatively low number, with comparable pneumonia/influenza mortality in Australian Army units in the same area ranging from 0/1000 men to 40/1000 men. Overall, this suggests that the Asian units were not different from other Allied military units in France at the end of 1918 and, thus, were not a likely source of a new lethal virus.¹¹ Mortality likely due to an early influenza epidemic could not be discerned. Furthermore, most Asian laborers and soldiers who died of influenza did so later than other Allied military groups in the same area, suggesting that they were not the source of infection.

There were several limitations to this study. All official records have some omissions, however, the mortality rolls of the British and French Armies are thought to be nearly complete. Influenza kills only a minority of those infected, such that a virus causing little or no mortality could not be detected using these records. The irregular all-cause mortality peaks in both CLC and BEF during March–May 1918 occurred at the same time that the entire force was retreating in disarray during the final German offensives and likely represent some misclassified casualties who were missing in action. The Commonwealth War Graves data reported all-cause mortality and is, therefore, less clear than the French information, which eliminated other non-combat deaths. There are no such peaks in the disease-specific French data, indicating that there were no major disease mortality events prior to late 1918.

In conclusion, there is no evidence in the mortality records reviewed that supports the hypothesis that the 1918 influenza pandemic originated in China or Southeast Asia. A lethal respiratory disease known as “purulent bronchitis” was recognized by clinicians from the winter of 1916–17 in both Britain and France, and was subsequently observed to be clinically identical to cases seen during the late-1918 pandemic wave.^{12–14} Based on such clinical reports and recent genomic information, it seems most likely that the influenza virus that killed so many in late 1918 had been circulating within the armies of the First

World War for months-to-years prior to causing the pandemic of 1918–19.^{3,15}

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