

Australia's Experience of the 1918-19 Influenza Pandemic: Lessons Learned

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Disasters in the Twentieth Century in Australia

- 1902 Mt Kembla mine disaster 96
- 1919 Influenza pandemic >11,000 (+1200 soldiers)
- 1941 HMAS Sydney sunk 645
- 1964 HMAS Voyager collision 82
- 1974 Cyclone Tracy in Darwin 65
- 1974 Brisbane floods 12
- 1977 Granville train collision 83
- 1983 Ash Wednesday bushfires 32
- 1997 Black Hawk collision 18

Influenza Mortality in Australian States 1919

Without a doubt, the epidemic of 1919 had begun in the winter months of 1918. John Cumpston, Director General Health Australia

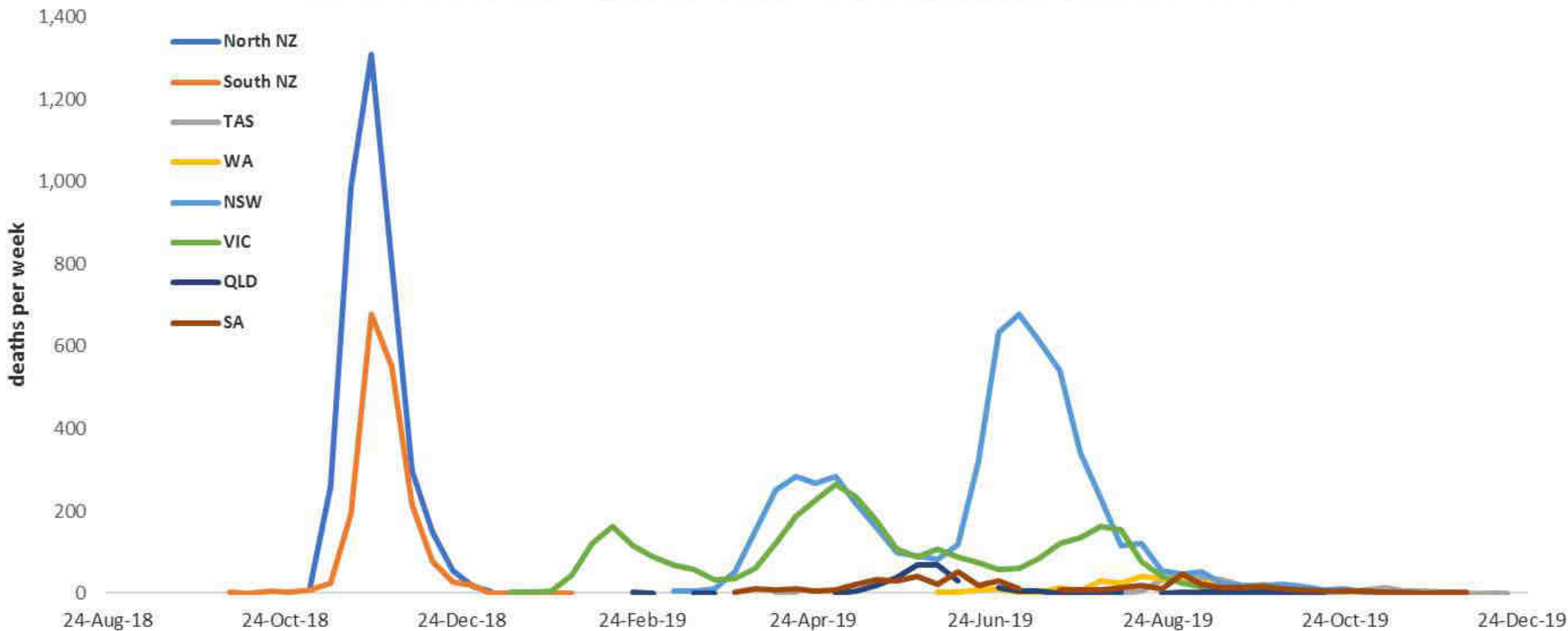
Influenza without great mortality had been circulating in both New Zealand and Australia since at least middle of 1918

For unclear reasons, Australian pandemic lagged New Zealand by 3 months and did not peak until mid 1919. Estimated 11000 dead.

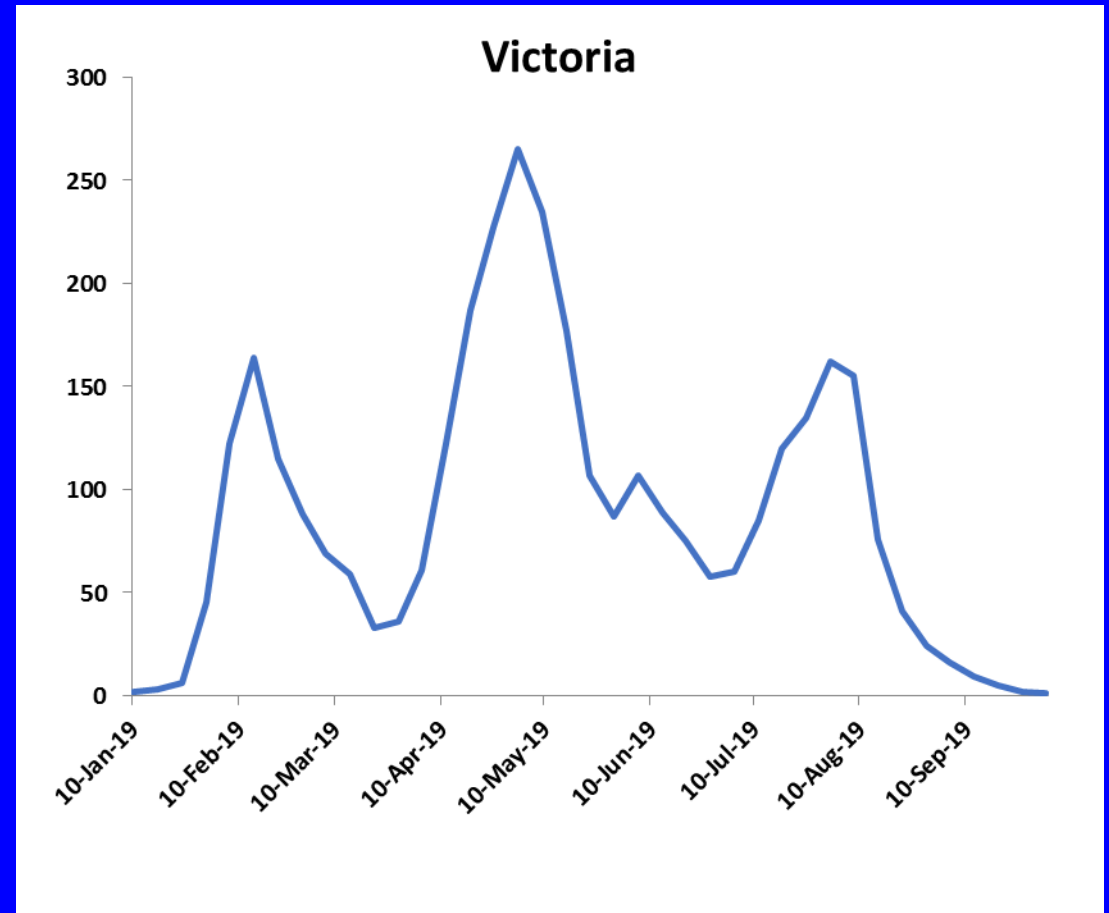
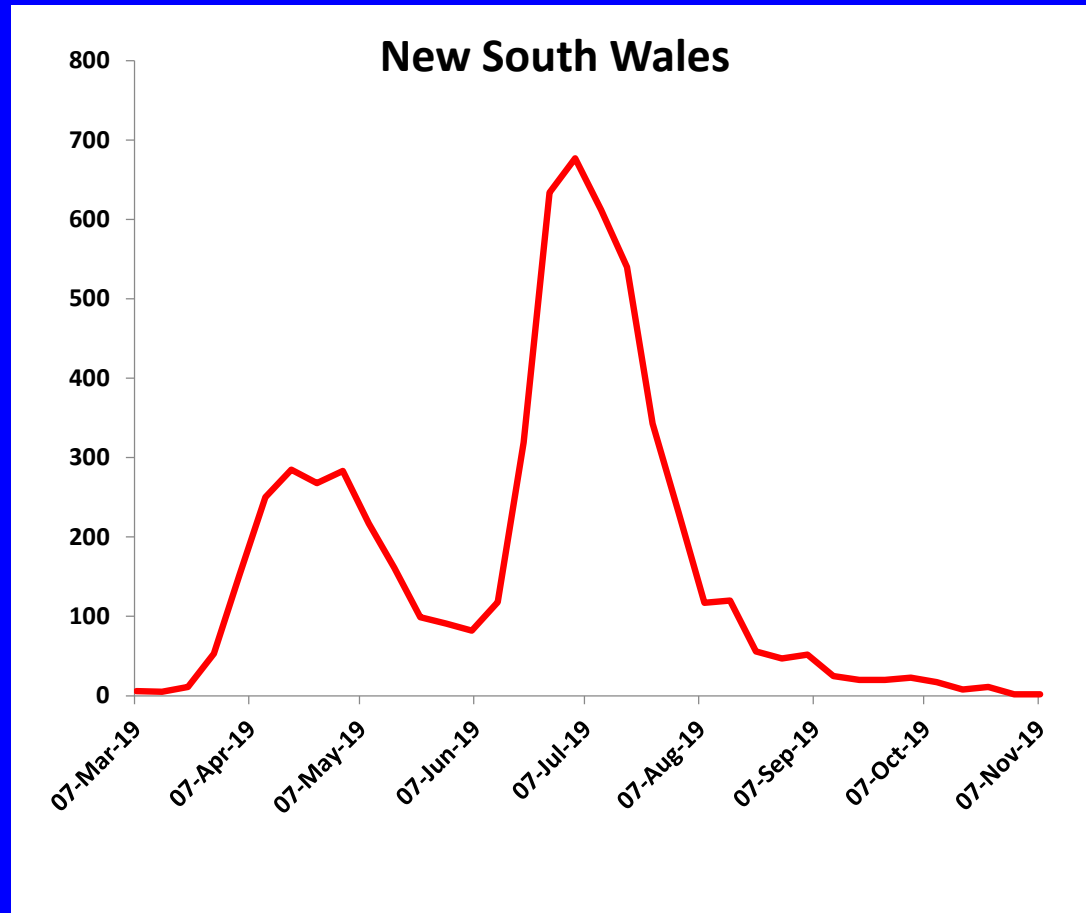
States like NSW / VIC had W mortality curves which were tri or biphasic, the states of WA and Tasmania had fewer deaths that lagged the rest of Australia by 3 months

Epidemic Curve New Zealand / Australia 1918-19

Number of Influenza Related Deaths New Zealand and Australia 1918-19

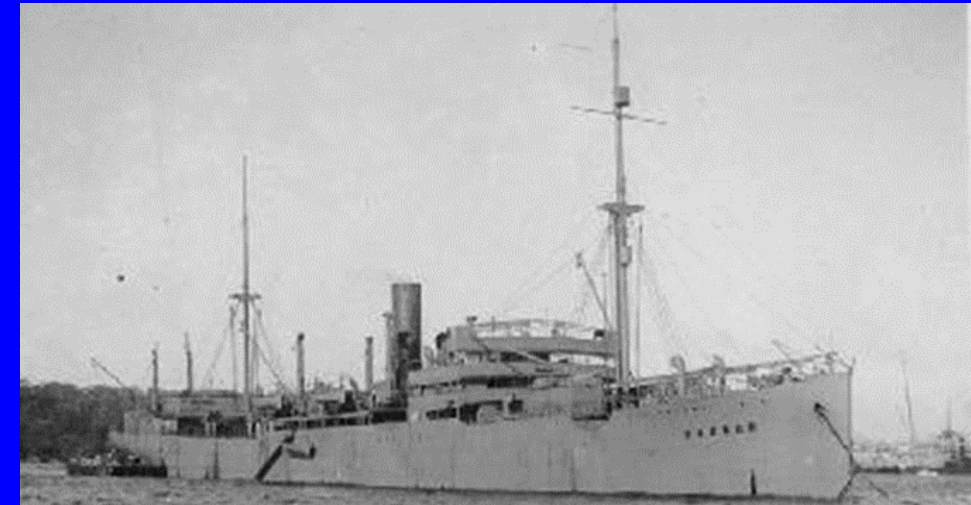


Biphasic (NSW) & Tri-phasic Epidemics (Vic)

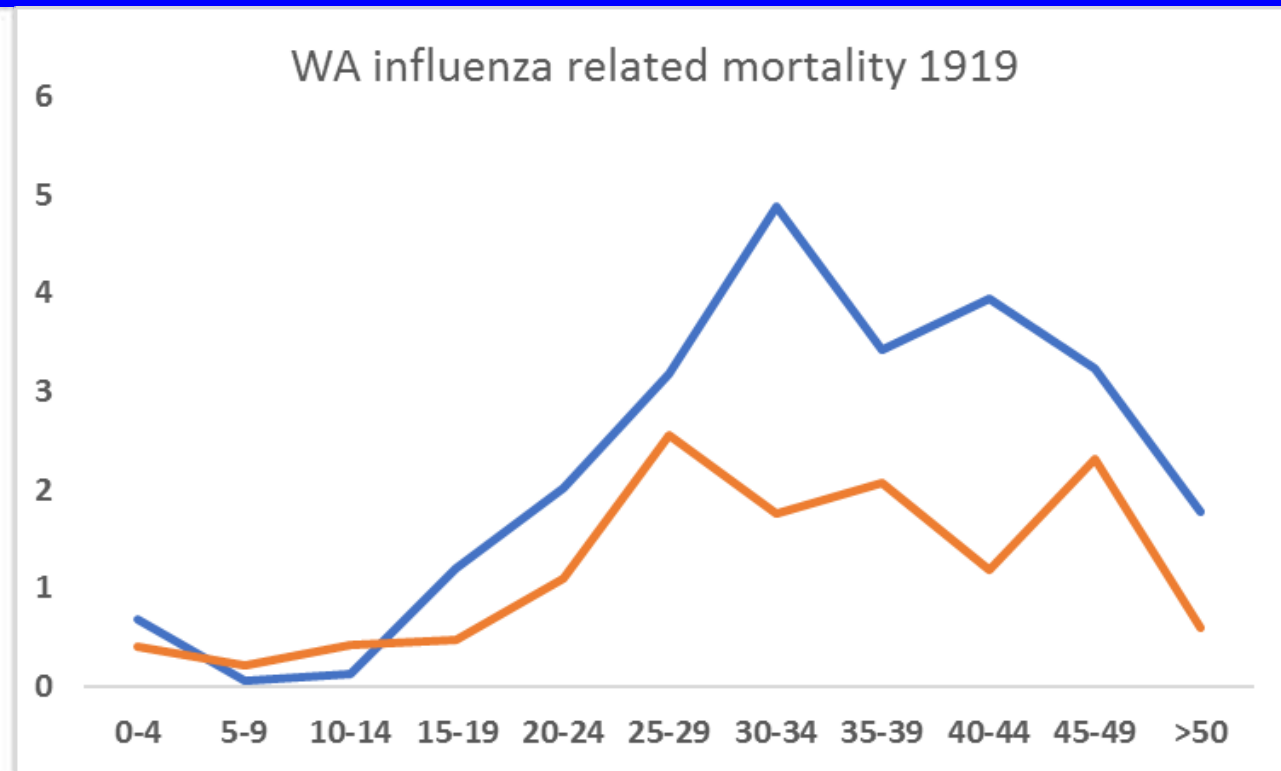
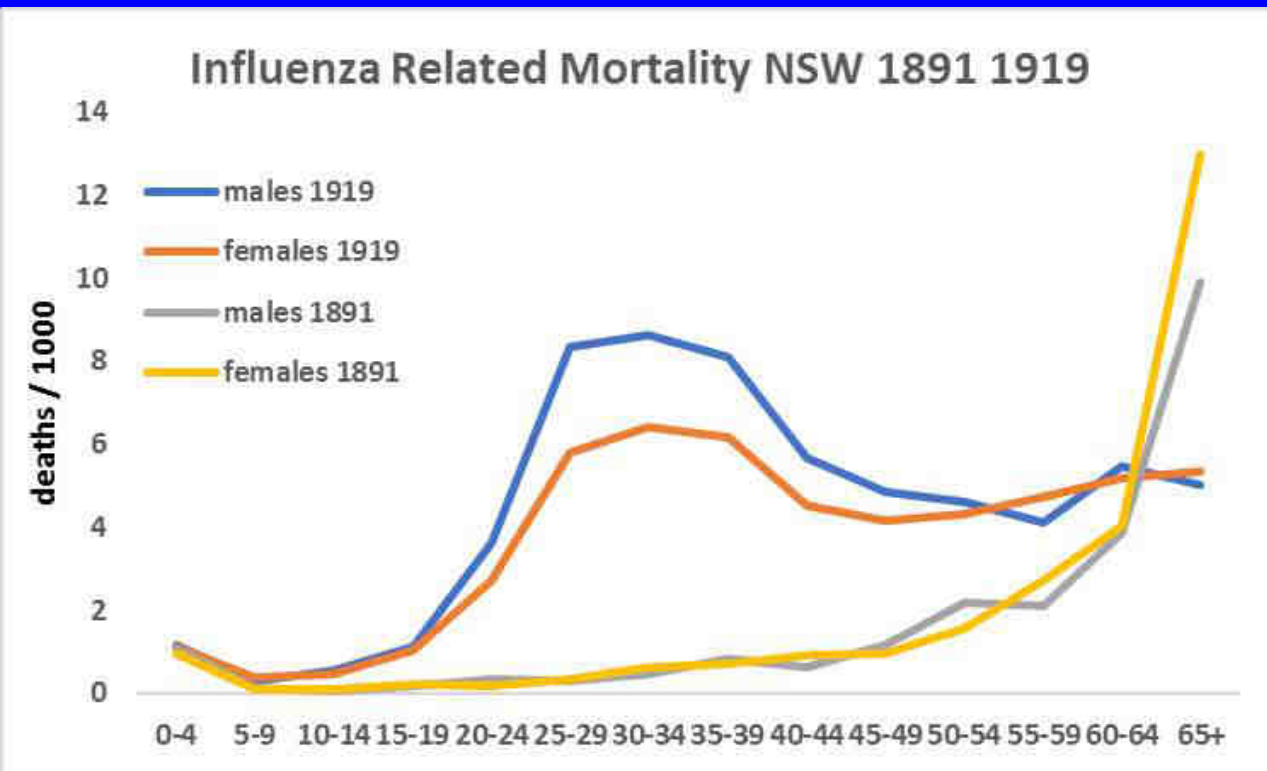


Origin and Onset of 1919 Influenza Varied

- Unable to trace direct lines of transmission of lethal wave of influenza,
- Multi-focal genesis suggests that influenza was already present in 1918 during the mid-year epidemic
- Although maritime quarantine is credited with delaying entry of virus into Australia (deaths in quarantine stations from Oct 18) this seems unlikely; quarantine may have delayed onward spread to Pacific islands as all shipping was stopped.



W Mortality Curve in NSW & WA, Australia 1919 compared to 1891 pandemic

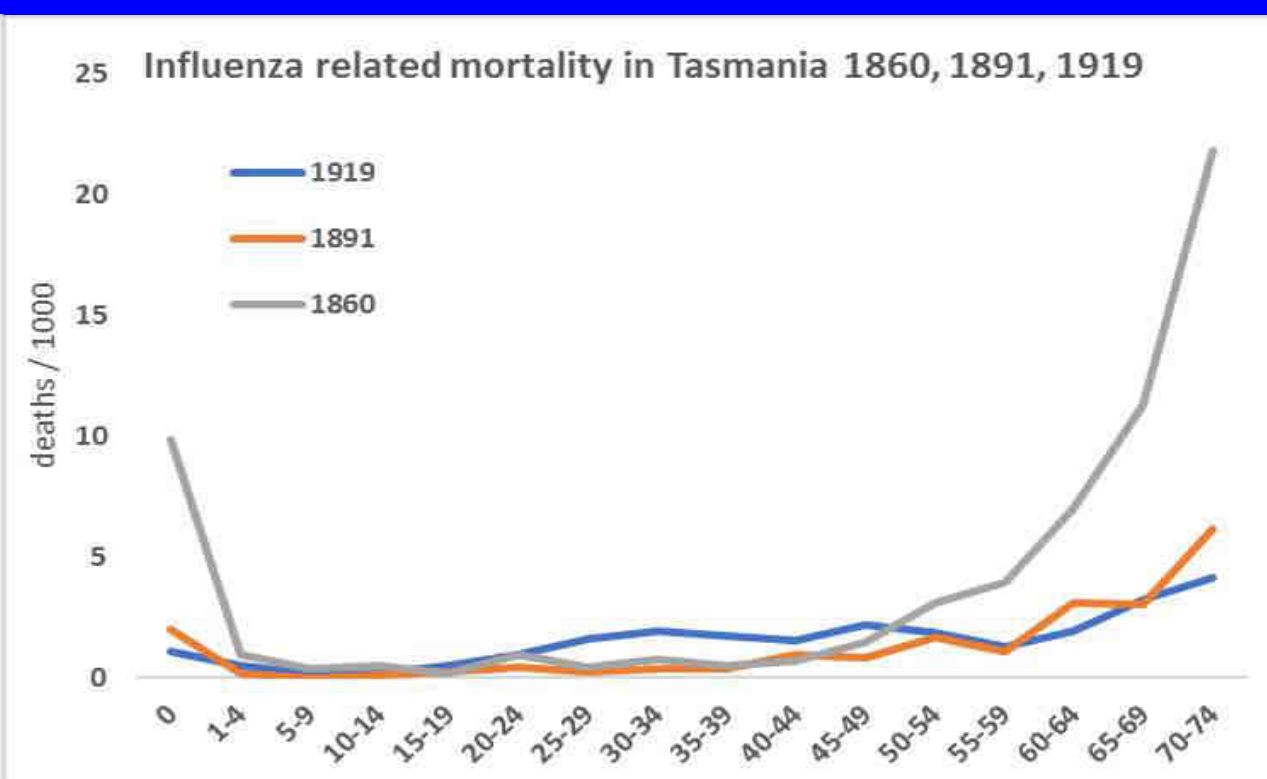
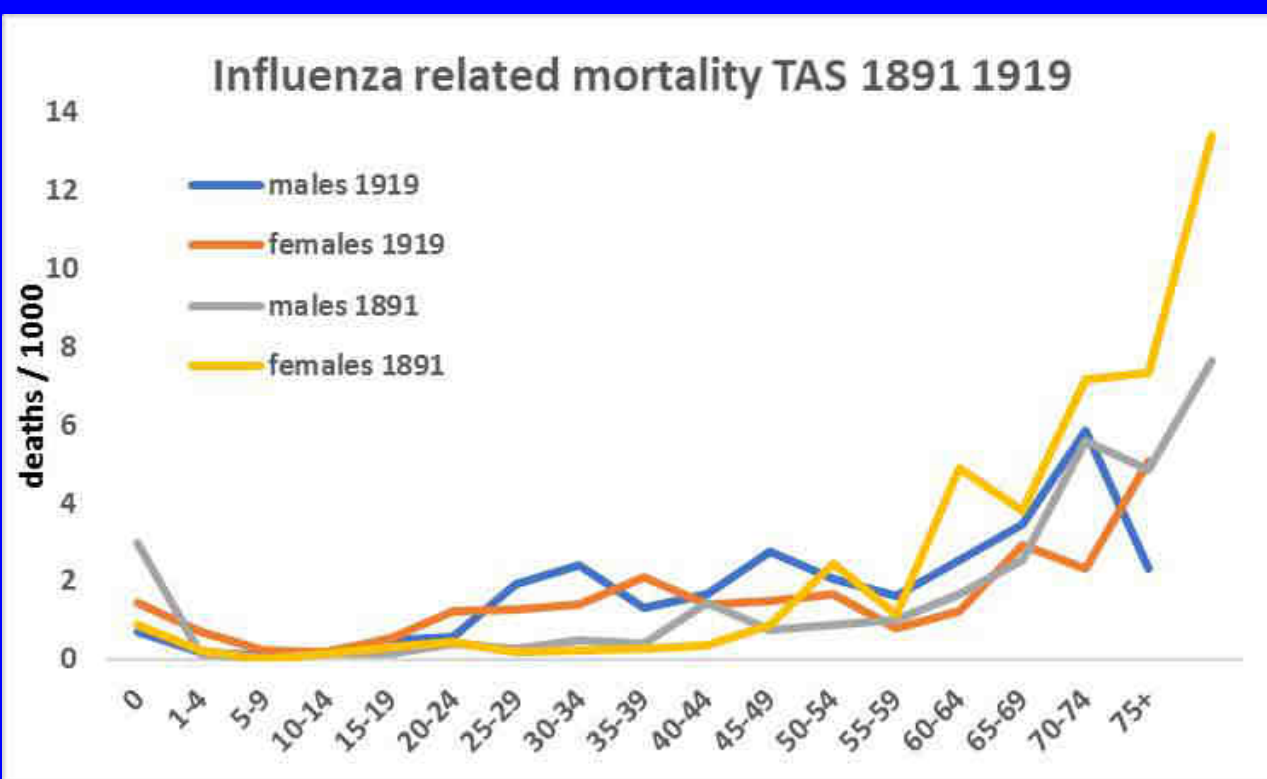


New Zealand and Tasmania Had Different Mortality

- Estimated mortality in New Zealand was 6 / 1000 whereas Tasmania was 1 /1000 despite many common features on both islands
- Lower mortality in Tasmania makes young adult peak as well as male > female mortality much less pronounced than what was seen in other states of Australia
- In Tasmania, the 1919 mortality due to influenza was not markedly different from previous pandemics in 1860 and 1891



Tasmania Exceptional as 1919 similar to 1891, 1860



Influenza as Reported in Tasmania October 1918

Launceston Examiner, 15 October 1918

- BURNIE. Influenza is still raging at Burnie. Hardly a house remains that has not been visited. The latest affected is that of a leading medical practitioner. Mr. E. G. Clarke also has had to cancel his appointment with Launceston show committee as judge of the Durham cattle.

Huon Times, 15 October 1918

- GEEVESTON. INFLUENZA. There is a good deal of sickness about; an epidemic of influenza still making headway, the seemingly immune at last coming under its sway, but the complaint must now have nearly run its course.

The Mercury, 16 October 1918

- SICKNESS ON WEST COAST. Our Queenstown correspondent telegraphed yesterday:- The weather is cool and stormy, and there is a deal of sickness in the town, mumps and influenza especially being prevalent.

Launceston Examiner, 17 October 1918

- KIMBERLEY..Influenza is raging, many homes having some family down with it...

The World (Hobart), 17 October 1918

- OATLANDS. Spanish influenza is very prevalent with us just now. Some 50 or more cases are reported, some in a very bad form.

Mortality Comparison Australia 1891 vs. 1919

- 1891 all < 1 / 1000 influenza attributable mortality
- 1918-19 range 1 to 3 / 1000 influenza mortality
- USA had 5 / 1000 and Samoa >200 / 1000 influenza deaths

	1891	1919
NSW	0.87	3.19
VIC	0.90	2.40
QLD	0.07	1.14
SA	0.53	1.13
WA	0.86	1.70
TAS	0.60	1.09

What Happened to the Aboriginal Peoples?

- Uncertain how many Aboriginals died as they were not counted as persons in early 20th century
- At least one third of recorded deaths in Queensland (1000) were in Aboriginal people
- Likely that situation was similar to excess mortality in NZ Maori;
- Risk likely was social isolation and not any genetic / racial factor



Political Drivers of Pandemic Preparation 1919

- Federation in 1901 stated that States would not restrict trade or conduct quarantine against other states
- Governor General's agreement to allow free movement of people following declaration of influenza's arrival lasted less than two weeks
- Members of Parliament closed train traffic after they left Melbourne



States' Fractious Reaction to Influenza Pandemic

- Quarantine camps were at seaports of entry but were also placed at state borders
- Meant to confine travellers for one week and then allow those who were not ill to proceed into next State
- Quarantine camps became centres of influenza spread as people waited to cross



State Library of Queensland

Australian Army in France / Palestine 1918

- Evidence of pre-existing lethal influenza virus in soldiers from at least 1916
- Pandemic in Australian soldiers in Europe was over by late 1918 before it even started in Australia; >1000 died
- In Palestine, cavalry operations abruptly ceased with onset of very lethal combined epidemic of malaria and influenza in October 1918





Australian War Memorial

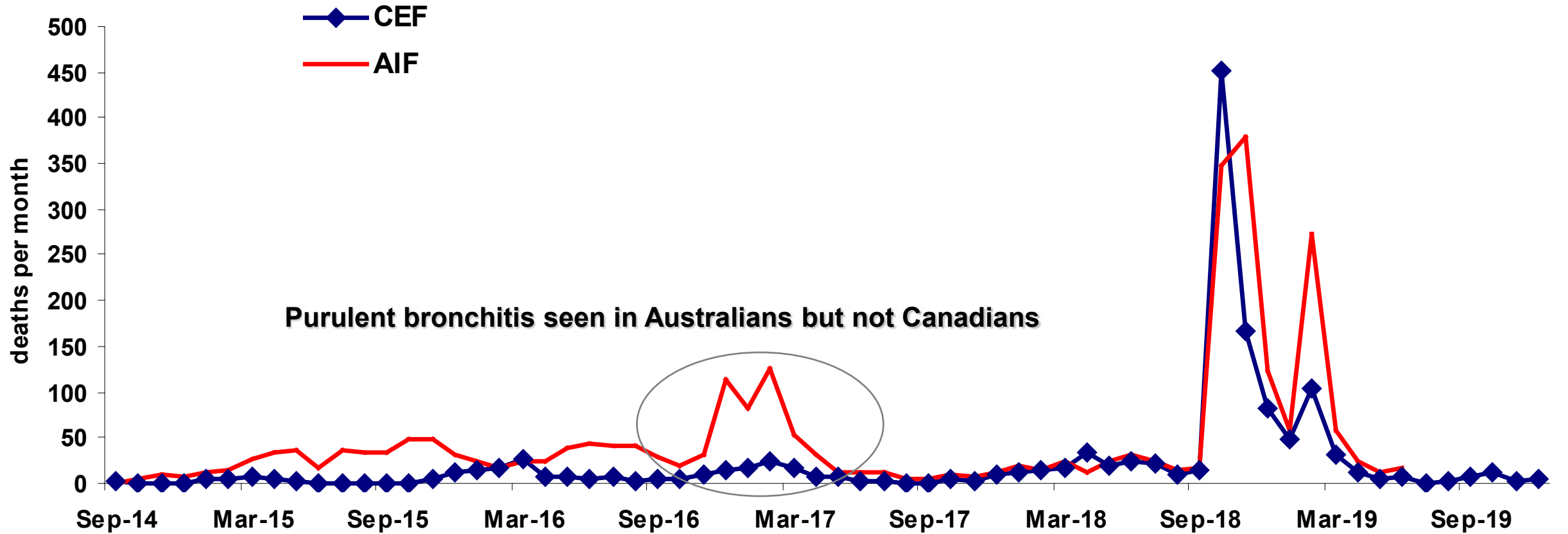


■ Killed in action □ none ■ Gallantry award ■ wounded ■ Hospitalized influenza ■ Died influenza

Photo from Australian War Memorial Canberra

Canadian / Australian Pneumonia Monthly Mortality

Canadian/ Australian Expeditionary Forces P/I deaths monthly 1914-19



Purulent Bronchitis in British Military Hospitals 1916-17

- Two independent *Lancet* publications in 1917 prior to influenza pandemic
- Marked by purple cyanosis (heliotrope) with high case fatality rate
- Observed prior to 1918 pandemic and apparently disappeared during from Europe in spring of 1917

ERS: PURULENT BRONCHITIS. [SEPT. 8, 1917 377

PURULENT BRONCHITIS: ITS INFLUENZAL AND PNEUMOCOCCAL BACTERIOLOGY.

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PURULENT BRONCHITIS.

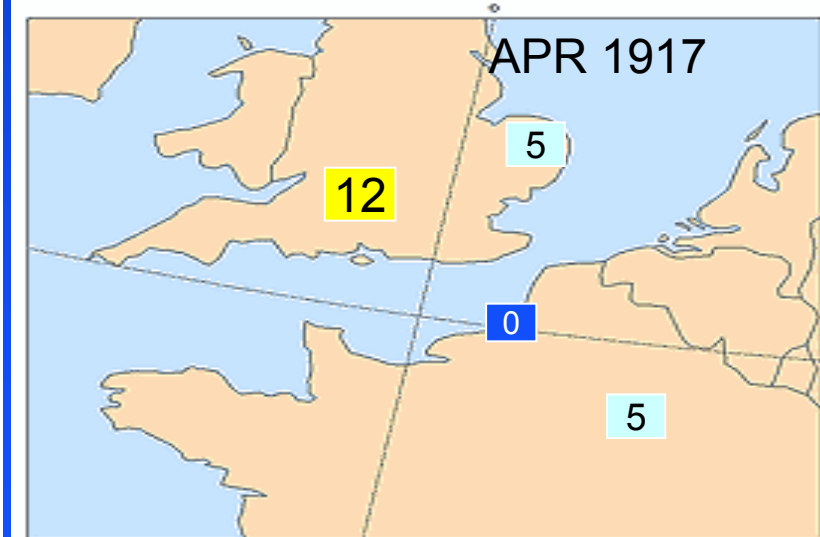
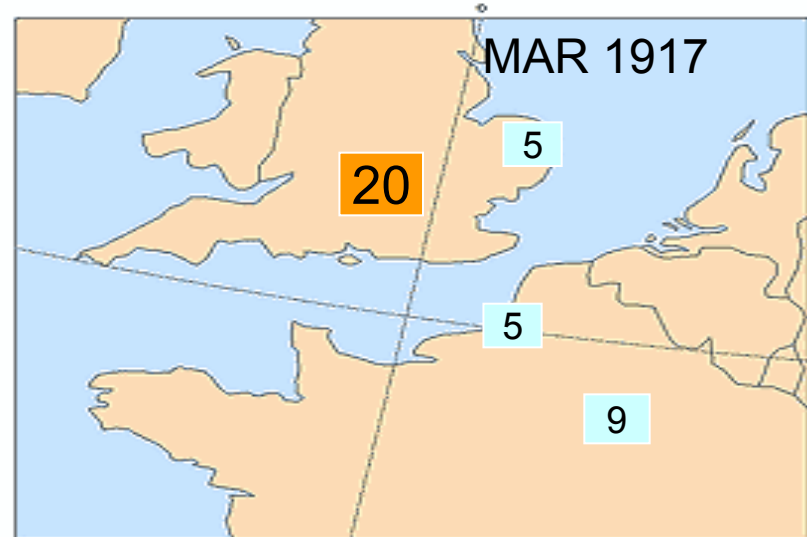
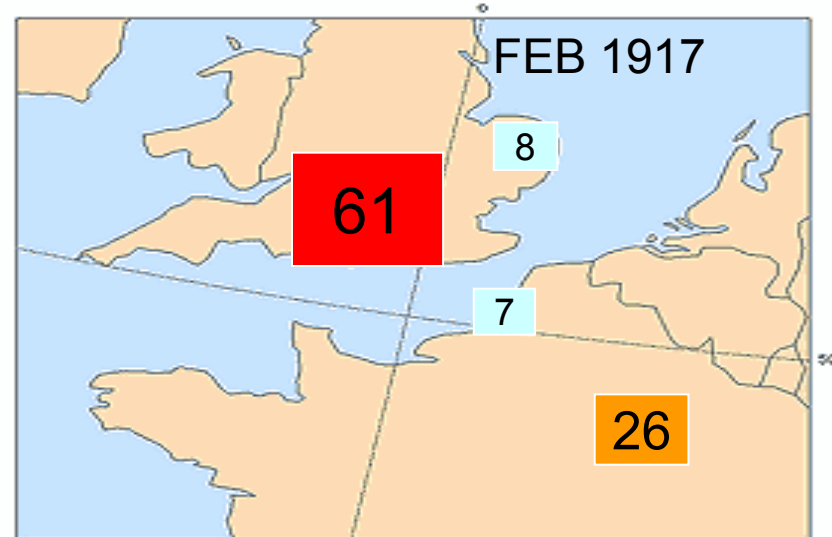
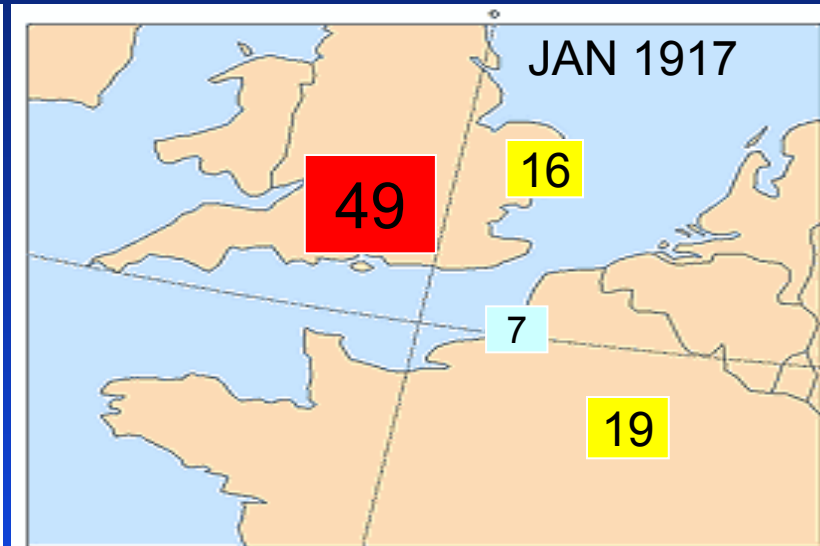
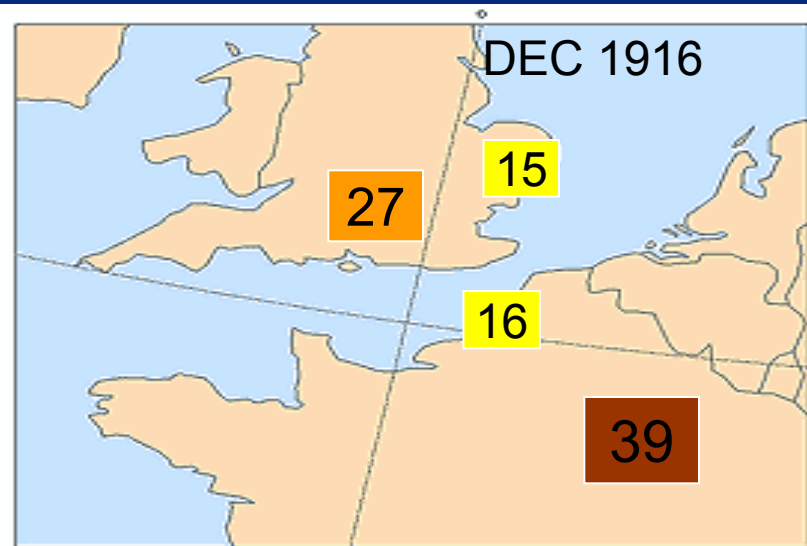
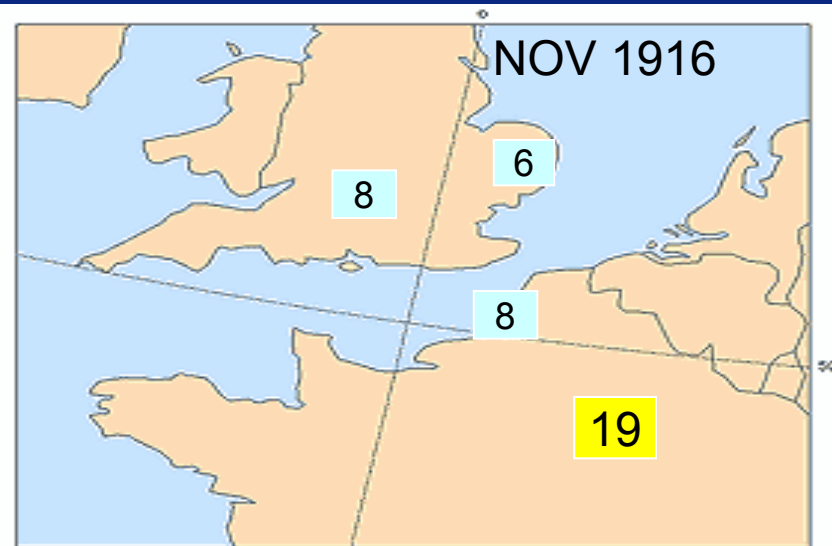
A STUDY OF CASES OCCURRING AMONGST THE BRITISH
TROOPS AT A BASE IN FRANCE.

BY J. A. B. HAMMOND, M.B. LOND.,
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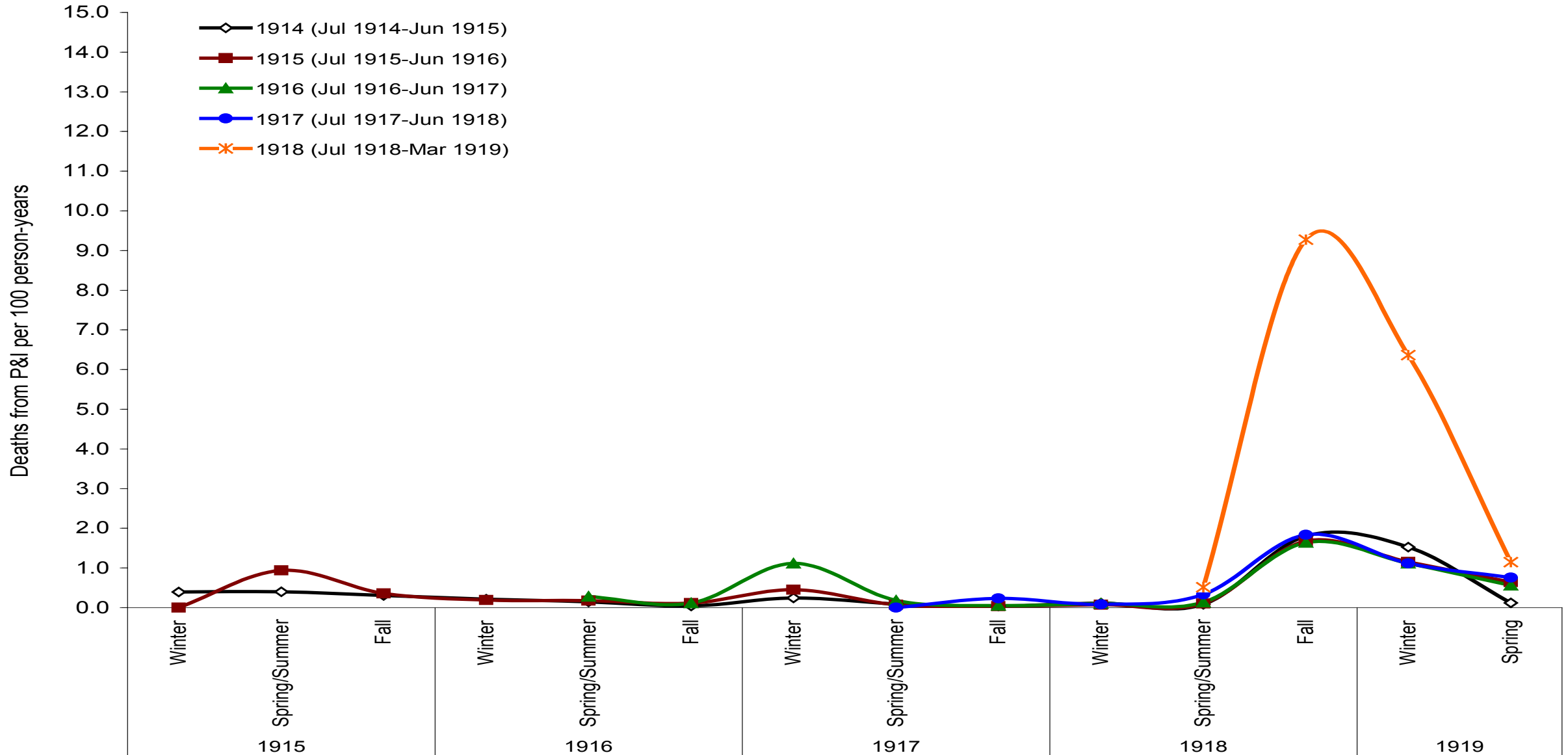
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T. H. G. SHORE, M.B. CANTAB., M.R.C.P. LOND.,
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— ADMINISTRATIVE AREA.

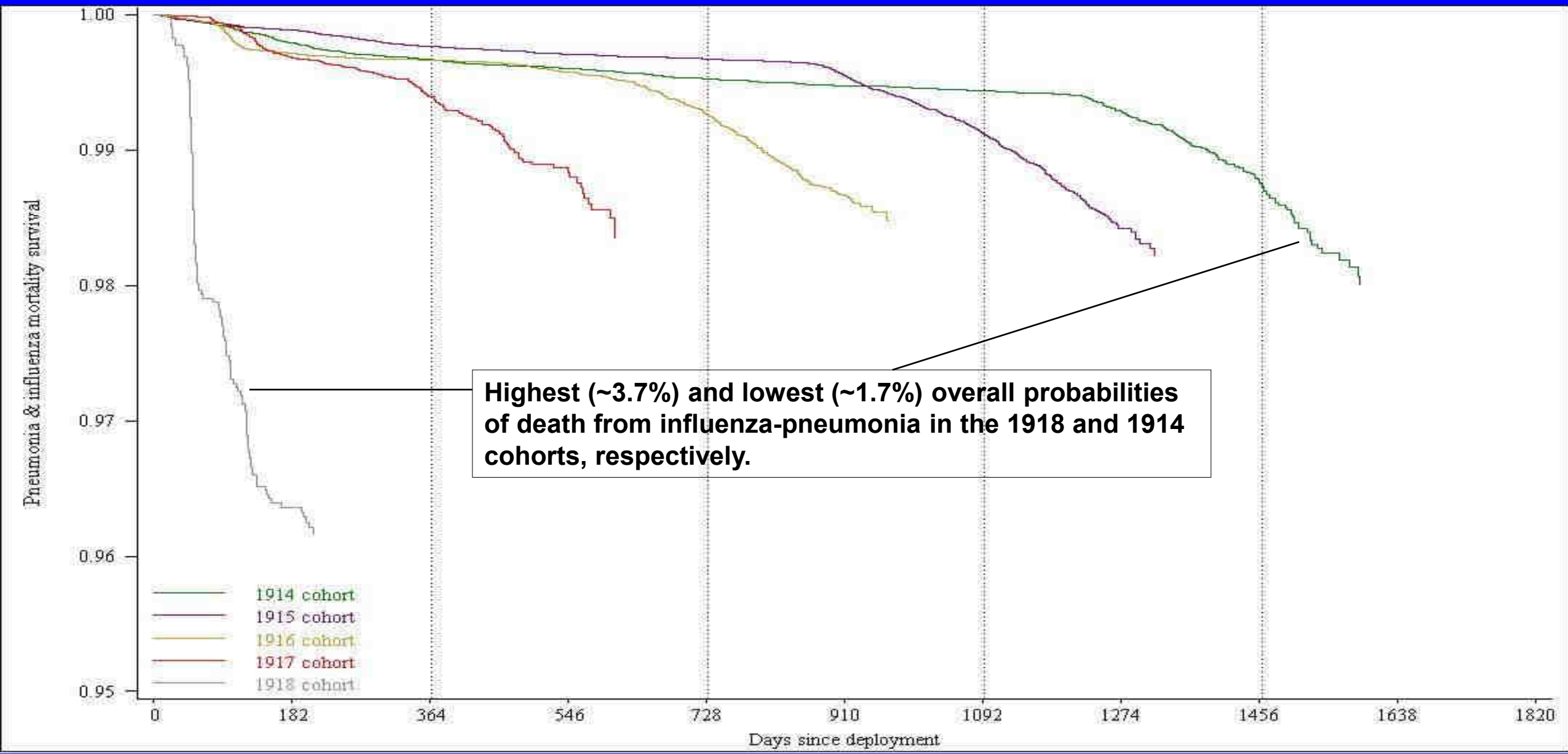
Lethal Pneumonia in UK, NZ, Aus Army



Mortality Inversely Proportional to Length of Army Service

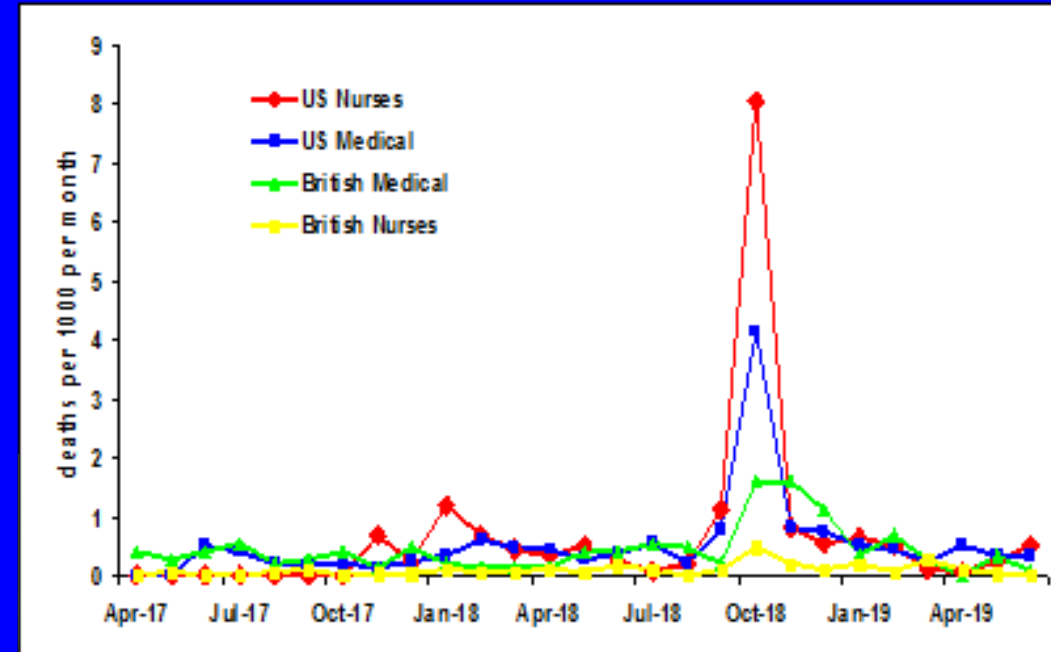


Pneumonia Survival Depended on Time in Military



Low Mortality in Medical and Nursing Personnel

- Large numbers of military doctors and nurses became ill but very few died during pandemic
- Exception was newly recruited US Army nurses and doctors who died at very high rates
- Immunity may have been more directed against secondary bacterial infections than any particular influenza virus



Low Pathogenicity Influenza-Like Illness in mid 1918

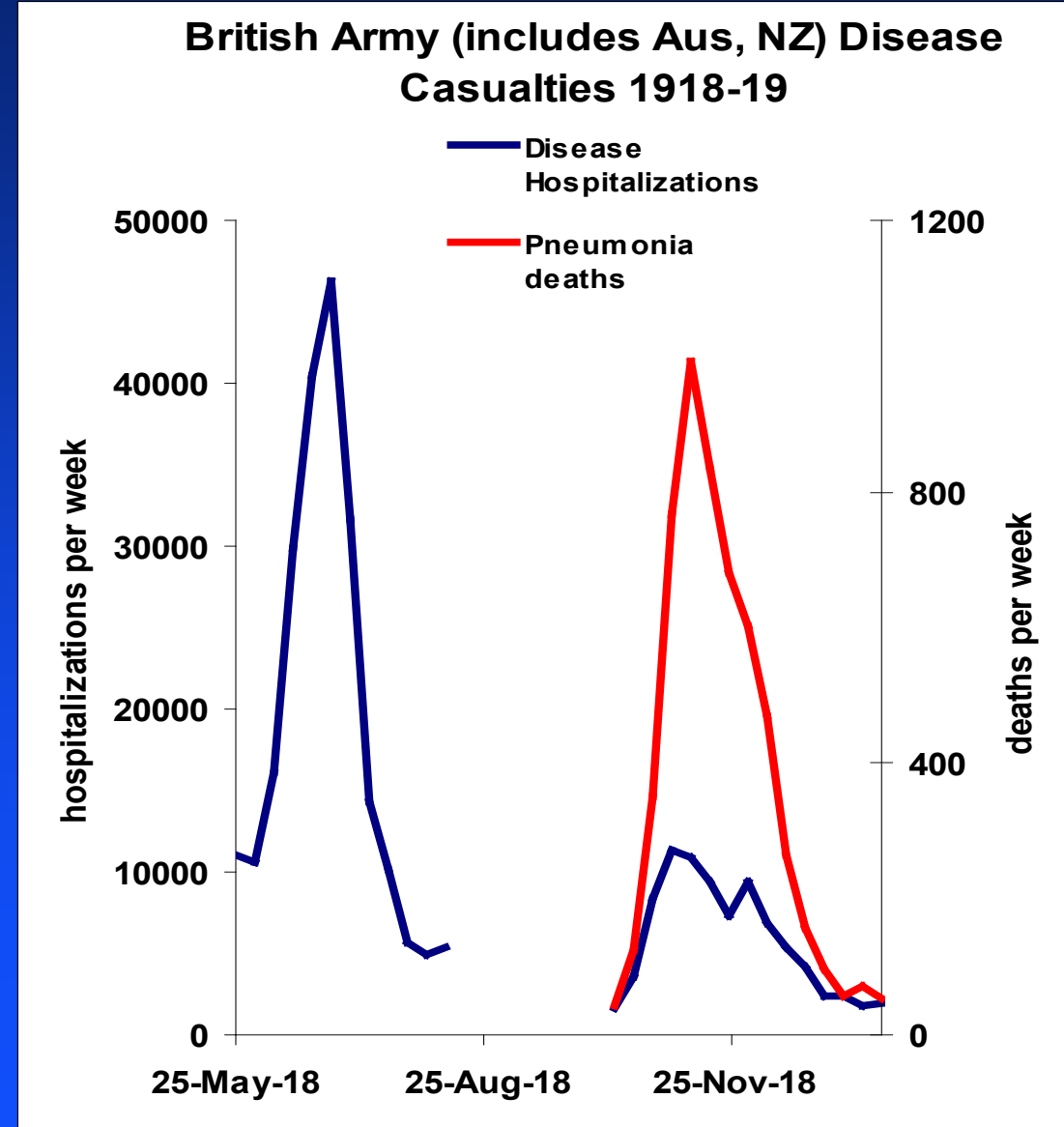
MAJ J S Mackay MC Australian Army
Medical Corps in a letter to his mother

24 June 1918 *“There has been a lot of influenza about- the diggers call it the Dog’s disease because of some foolish resemblance to distemper. I have had dozens of cases but so far have escaped it myself. The weather is cold and windy.”*



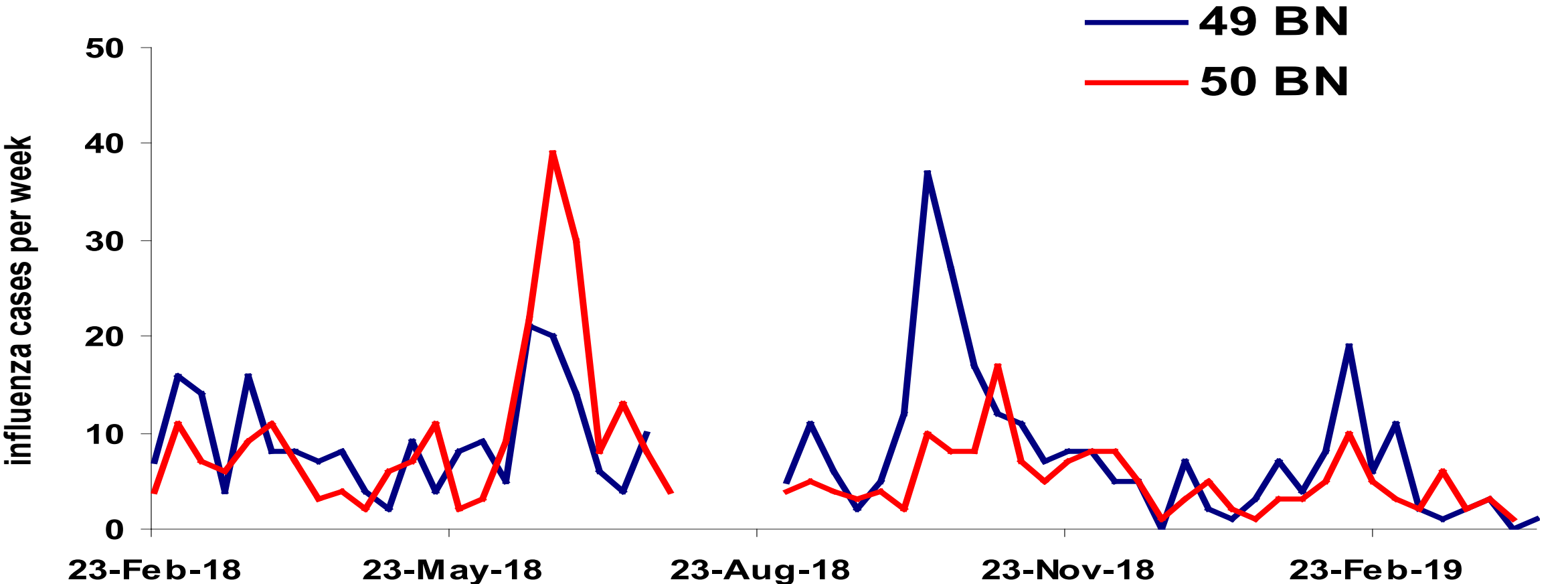
June- July 1918 “Influenza” Epidemic in France

- Among British / Australian / New Zealand soldiers, influenza morbidity was five times higher in Jun - Jul 1918 than October - December 1918
- Virtually no mortality seen during June - July 1918 wave
- Hospitalization for influenza-like illness Apr - Jul protected Australian soldiers against death in Oct-Dec
 $OR = 0.37$ (CI 0.26 - 0.53) $p < 0.001$



Disease in Early 1918 Prevented Death Late 1918

Influenza Like Illness Australian Infantry 1918

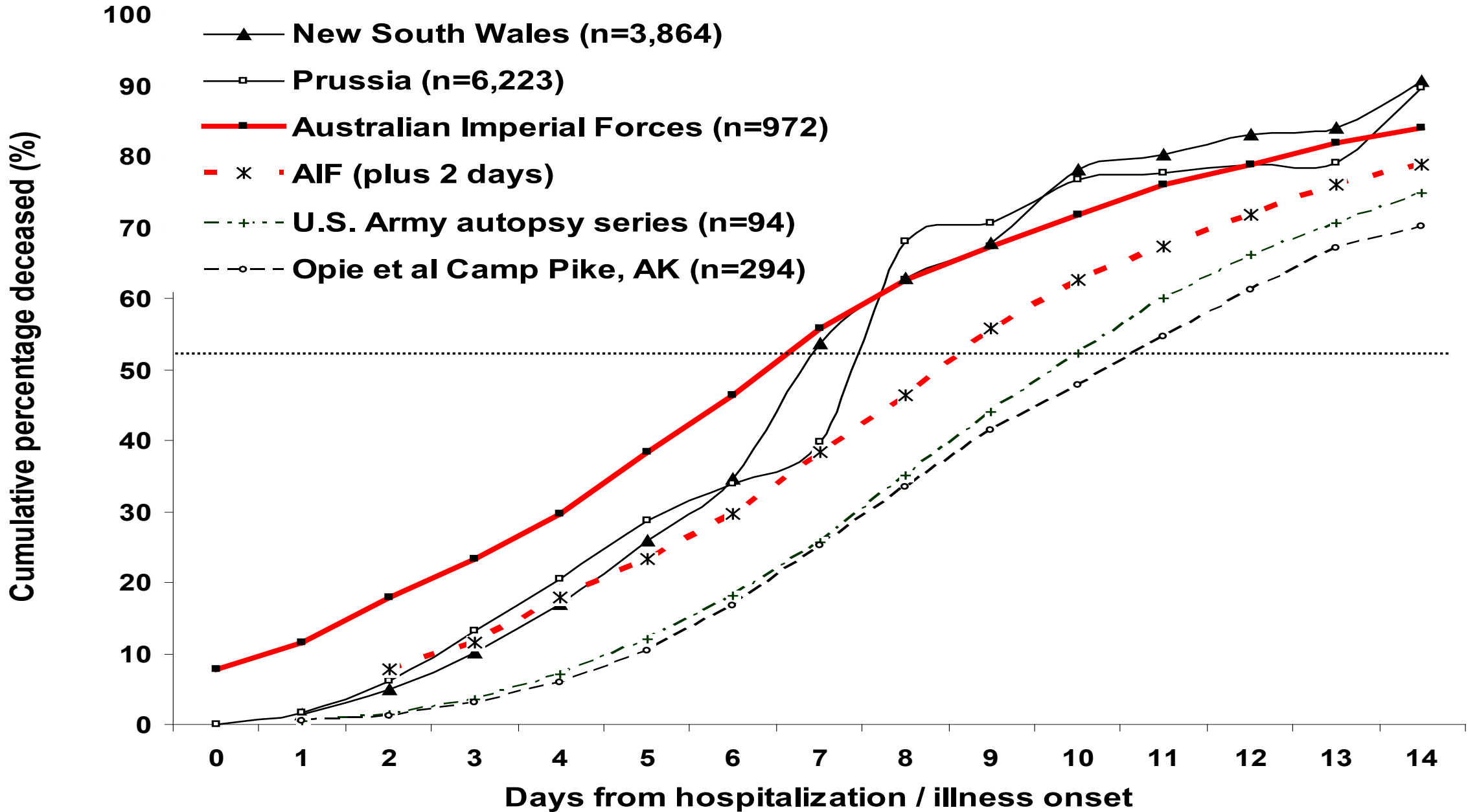


Hospitalizations in early 1918 50 BN > 49 BN; mortality reversed in late 1918 49 BN (n=22) vs. 50 BN (n=2)



Photos from Australian War Memorial Canberra

Cumulative percentage deceased from influenza/pneumonia, by days after illness onset / hospitalization, 1918-9



Most Deaths from Secondary Pneumonia

- Death due to secondary bacterial pneumonia not primary viral pneumonitis
- Most deaths occurred > 7 days after illness began, when lung defences against bacteria pathogens were dysfunctional until epithelium restored
- Secondary pneumonias due to common respiratory pathogens (*S pneumoniae*, *H influenza*, *Staph aureus*)



Probable Epidemiological Factors Explaining Young Adult Mortality during Influenza Pandemic 1918-19

- Recent infections: infection early in 1918 protected against death but not infection late in 1918 or 1919
- Distant infections: Sharp W mortality curve suggests early life exposure ~1890 to create 28y old peak
- Isolation / ethnicity: Few previous respiratory infections increased risk of mortality in 1918
- Secondary bacterial infection: influenza made host susceptible to bacterial pneumonia especially in crowded places such as Army camps

Lessons from Australian 1918-19 Influenza Pandemic

- **Who you were and where you were made a great difference in one's mortality rates during 1918-19**
- **Most consistent explanation for low mortality areas was infection by earlier wave of influenza in 1918**
- **Quarantine and isolation during pandemic are fraught with problems and are often driven by politics rather than science**
- **1919 influenza pandemic was produced by unique events and a similar event is extremely unlikely given current epidemiology**

Influenza Pandemic Study Group



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