

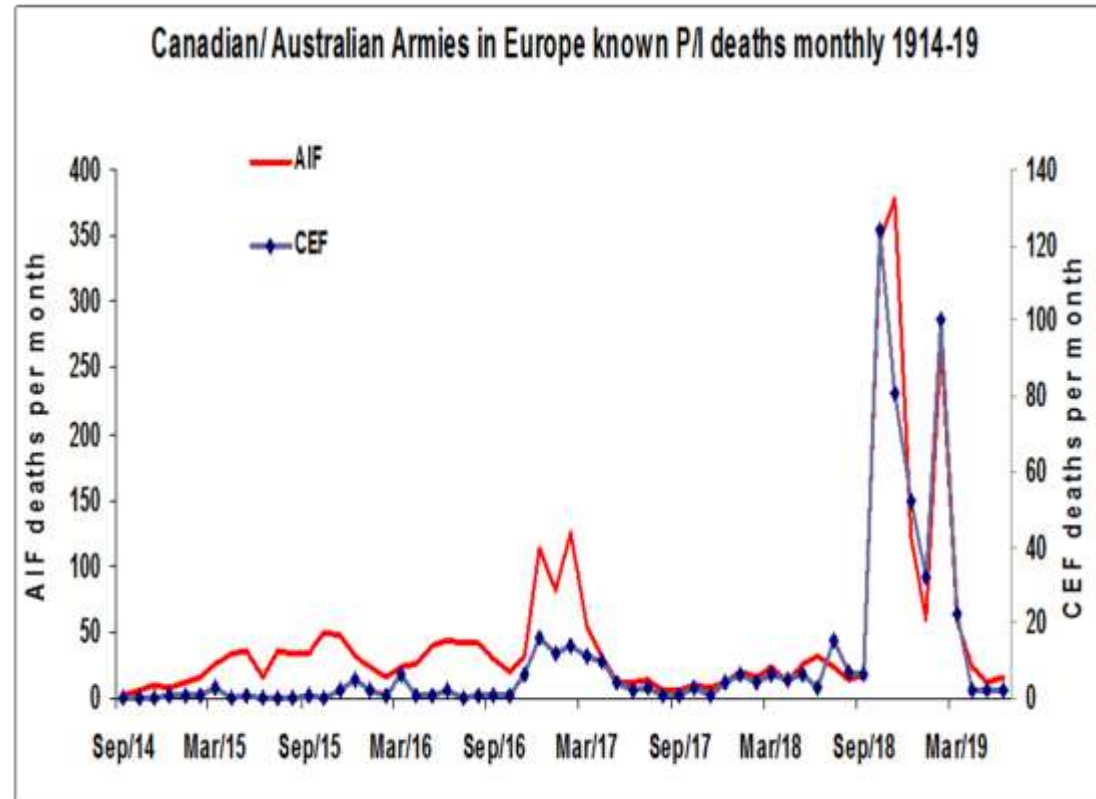
Epidemiology of Influenza Pandemic of 1918-1920 from USA, UK, Canadian, ANZAC Military Sources

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Early Origins of 1918 Influenza Pandemic

- **Lethal respiratory illness in Canadian soldiers in UK 1914**
- **“Purulent Bronchitis” in British Armies in France 1916-1917**
- **New lethal respiratory infection with same symptoms that re-appeared in late 1918**



“Purulent Bronchitis” of 1916-17

- New lethal respiratory disease described in early 1917 as “*purulent bronchitis*” with heliotrope cyanosis
- Noted in Military Hospitals in France / UK
 - Dec 1916 to Mar 1917
- Said to be same as what had been seen in 1914-15; very similar clinically to the main influenza pandemic in 1918

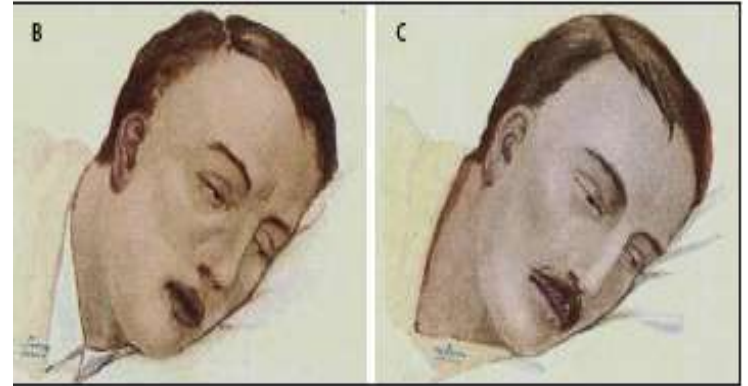
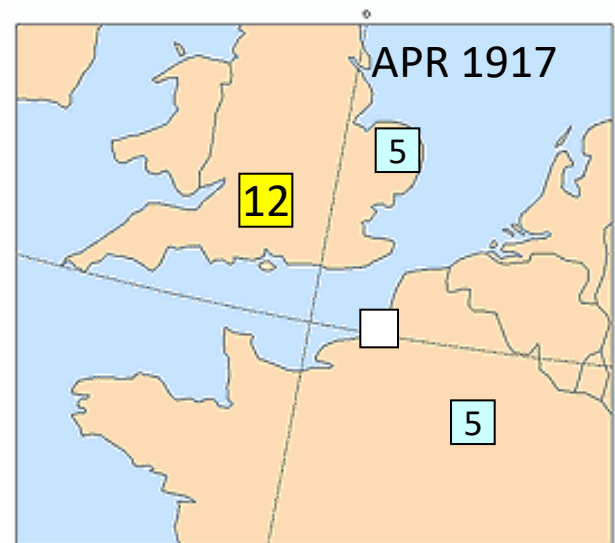
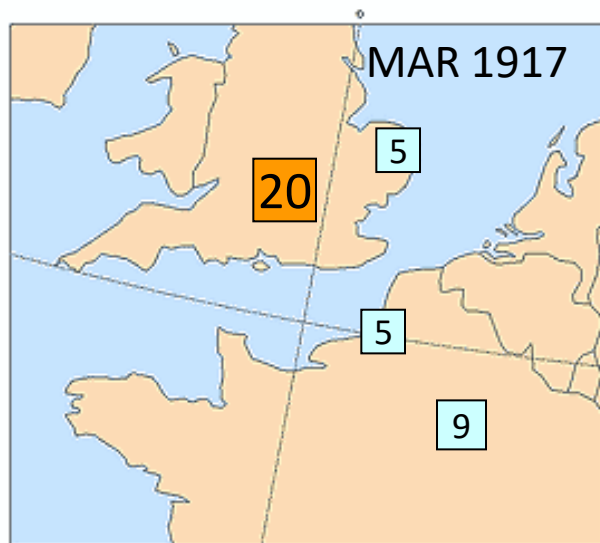
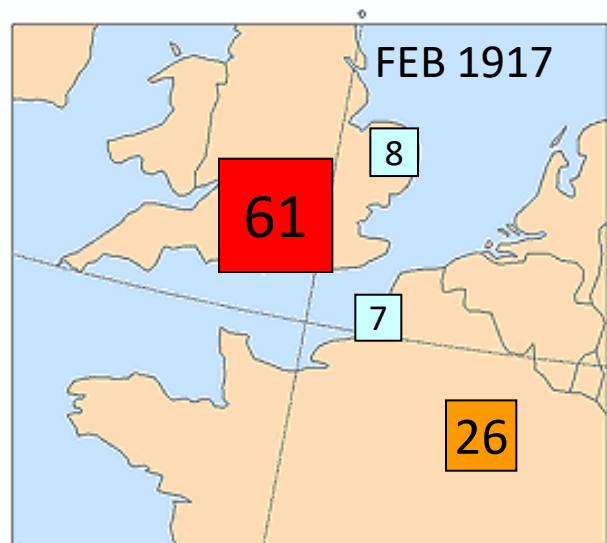
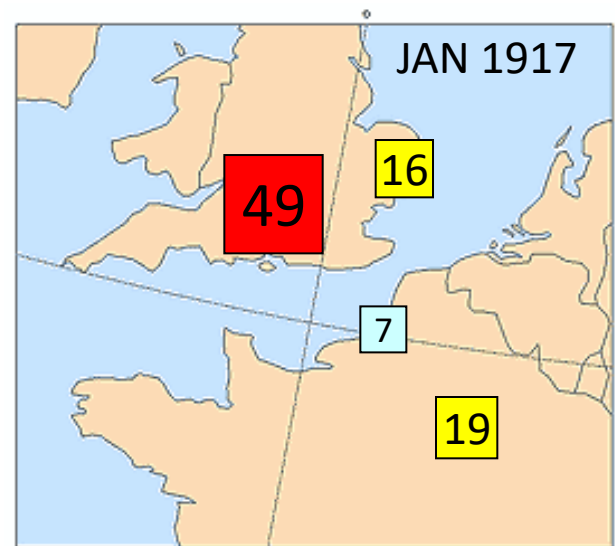
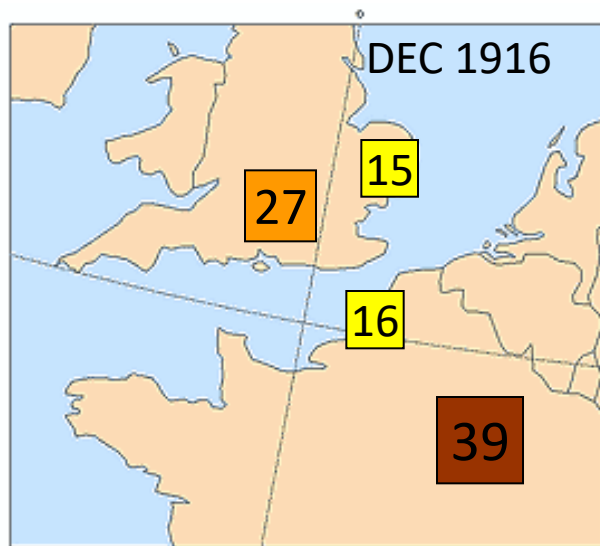
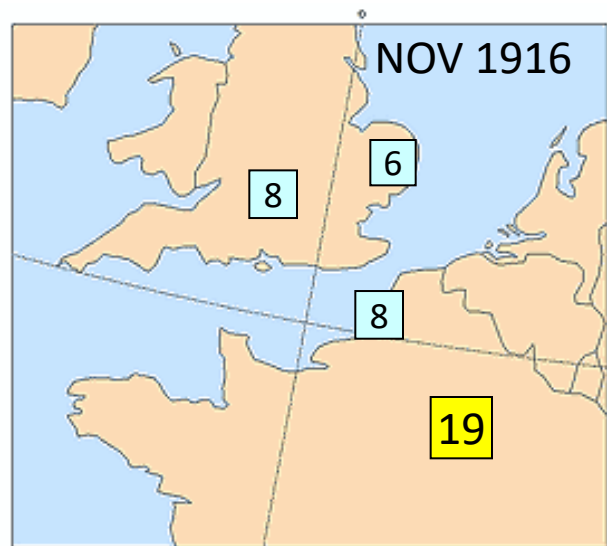


Figure from Lancet 1919

Clinically recognisable almost at sight, yet different from anything we have been familiar with in men of military age in civil life. To this peculiar type of case we have applied the designation “purulent bronchitis”

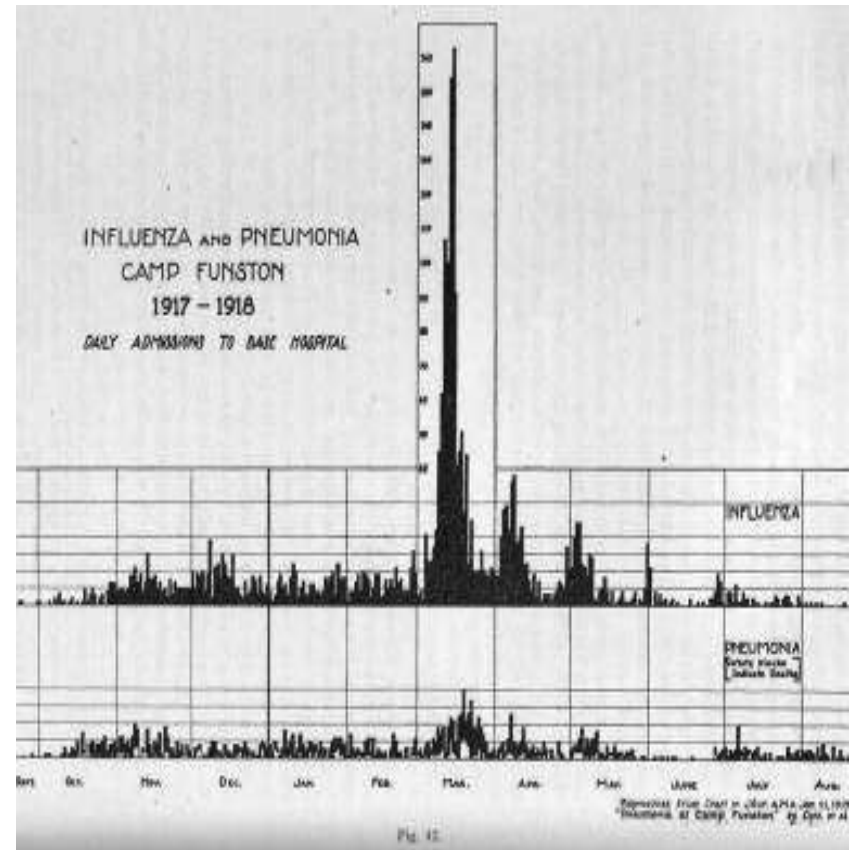
CAPT A Abrahams on soldiers at Aldershot, UK in Lancet 1917

Lethal Pneumonia Cases in UK, ANZAC Armies in Europe Nov 1916- Apr 1917



First Pandemic Wave in Early-Mid 1918

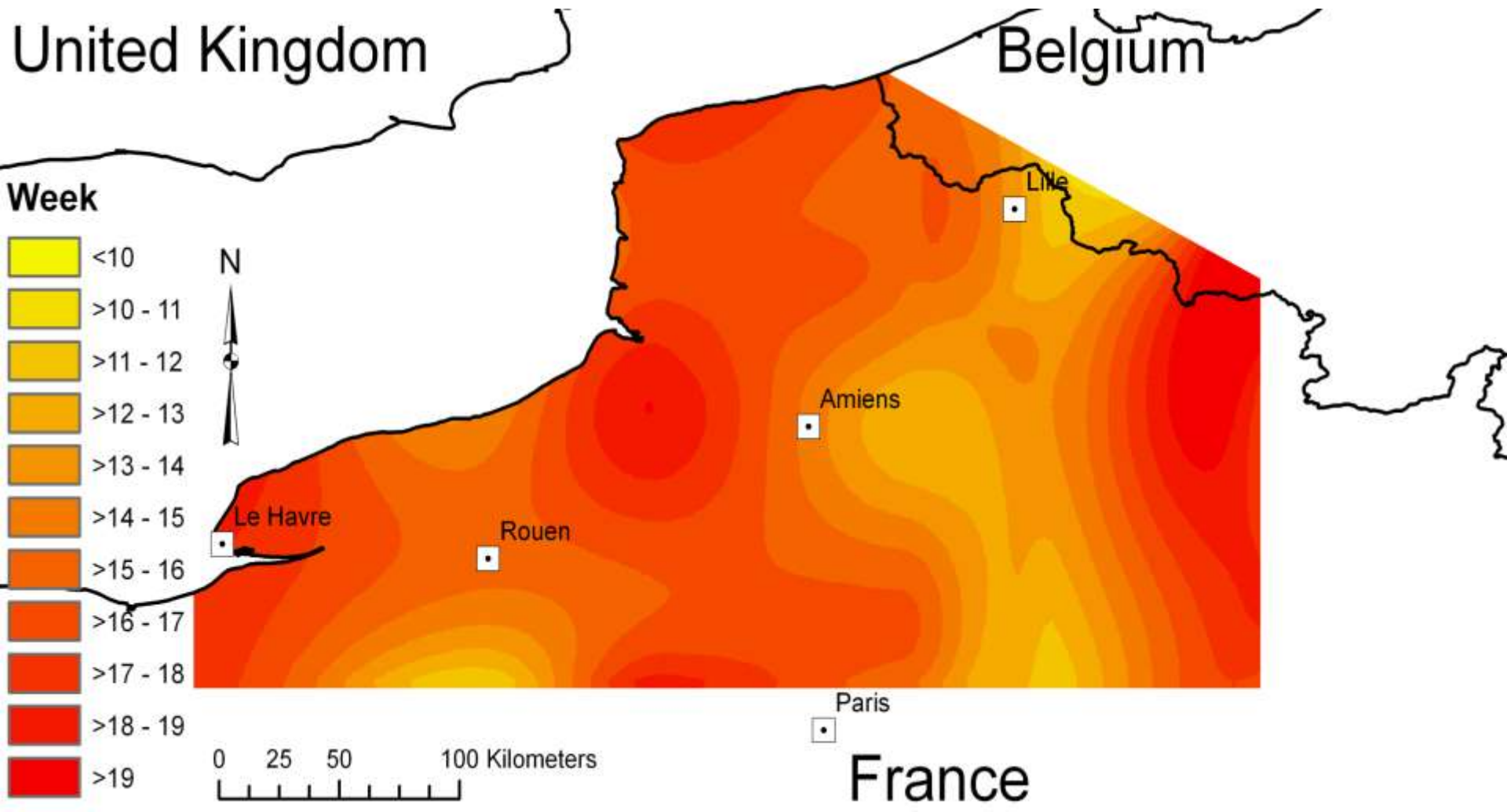
- High morbidity, low mortality ILI wave through battle areas as well as distant island bases
- Military importance of early wave despite $< 0.5\%$ of mortality of late wave
- First Wave protected against death but not infection



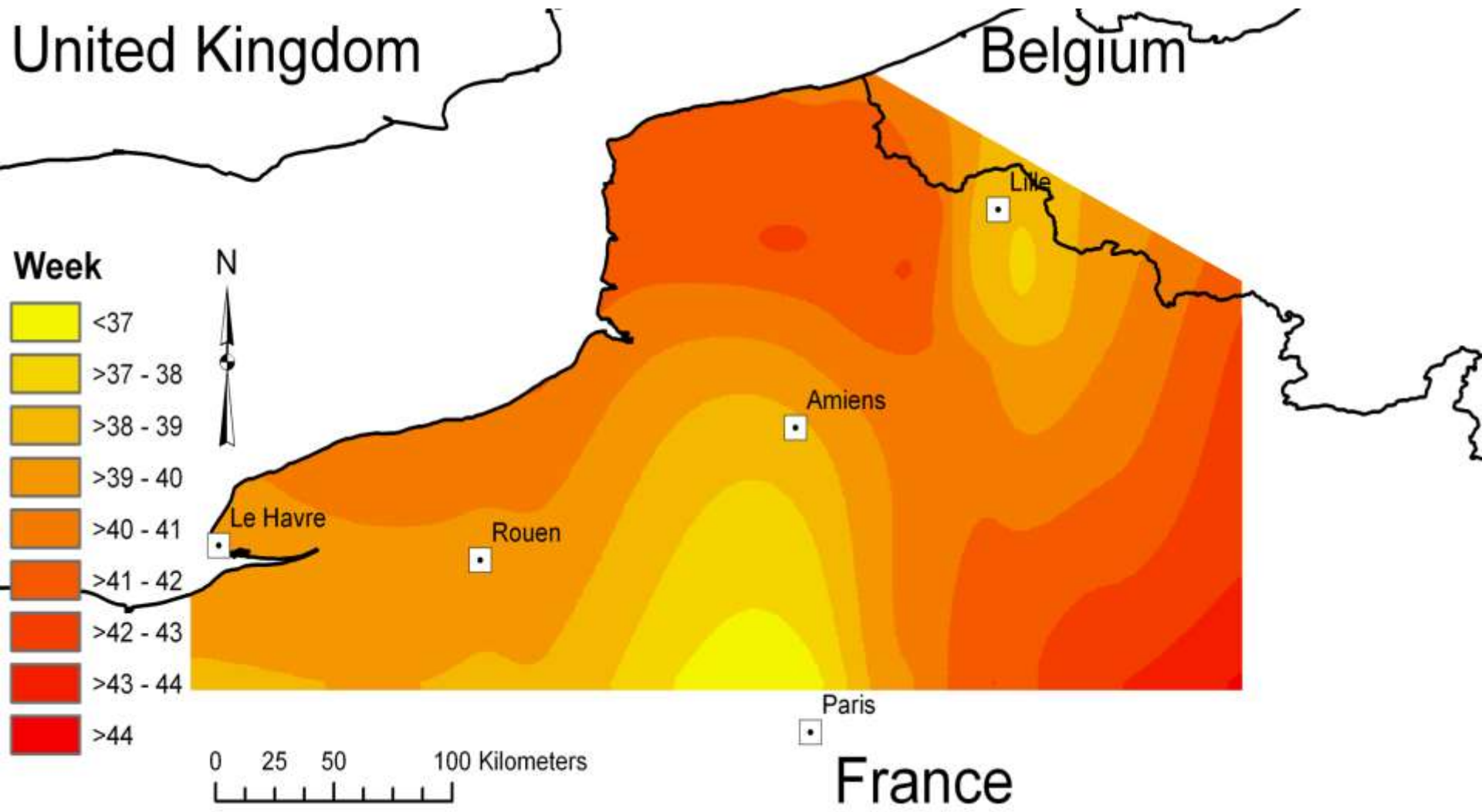
Camp Funston Kansas was unlikely source of pandemic

First Wave in British Army in France / Belgium

(spread from trenches into rear areas)

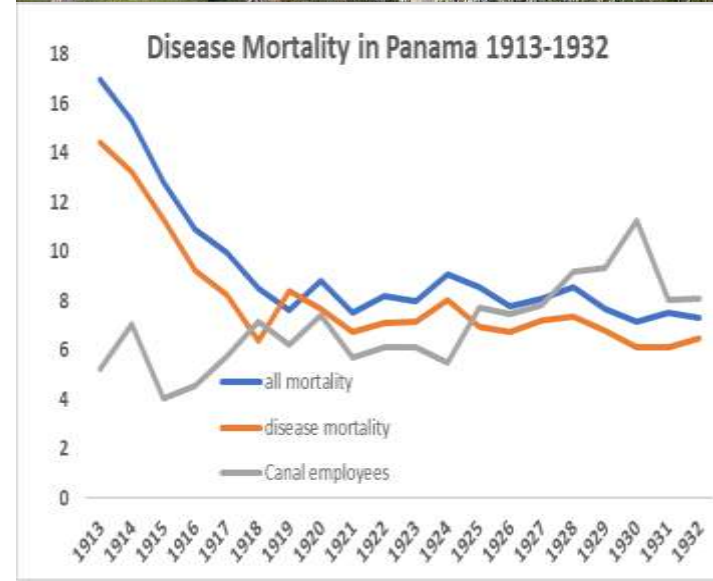


Lethal Second Wave in British Army (spread from rear area into trenches)



Isolation was Risk Factor while Globalization Protected

- No measurable mortality signal in Panama 1918 despite best records anywhere; Panama Canal was hub of world transportation network
- No Puerto Rican soldiers died in Panama whereas 5% of PR workers died at Camp Jackson, South Carolina
- Protection likely due to previous influenza infections earlier in 1918



Australian Army in France / Palestine 1918

- Influenza in Australian soldiers in Europe / Middle East was over before it started in Australia; >1200 died
- Australian soldiers recruited in 1918 were at the highest risk of death >14x compared to 1916 cohort
- Those infected in first wave of influenza in early 1918 were protected (OR=0.37) against death but not disease requiring hospitalization in late 1918





Photo from Australian War Memorial Canberra



Killed in action
 none
 Gallantry award
 wounded
 Hospitalized influenza
 Died influenza