Strengths and Weaknesses in the NZ Military’s Response to Infectious Diseases in the First World War: A Brief Review

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Burden of deaths from disease
(at least 1297 deaths; 8% of all deaths in the NZEF)

Disease deaths amongst the NZEF (as per the Roll of Honour)

Number of deaths

- Died of disease (DOD)
- Mainly disease (Sections 2 & 3)
Strength: Use of vaccines for prevention

- Study of **mixed bacterial** vaccine – evidence of benefit (pandemic influenza) & modern re-analysis supports this

- Impressive even doing a study given wartime difficulties [Chien et al 2010, *JID*]

- **Typhoid** vaccine used by the NZEF (modern review supports benefit in WWI) [Bresalier 2011]
  - Still 126 deaths in NZEF [Carbery 1924]
Strength: Use of vaccines for prevention

• **Anti-tetanus** serum (modern evidence of benefit in WWI)[Wever & van Bergen 2012]
  – Only 3 tetanus deaths in NZEF[Carbery 1924]

• **Smallpox** vaccine (including post-outbreak)
  – Only 6 deaths in NZEF[Carbery 1924]
But vaccination was perceived somewhat negatively:

Wairarapa Archive 11-151/1 as reproduced in: Frances N. “Safe Haven”. Masterton; Wairarapa Archive / Fraser Books 2012
Strength: Effective malaria control (some areas)

Eg, diagnostic stations used in Palestine (Australian & NZ army) helped diagnosis & facilitated mosquito control activities eg, drainage of mosquito sites [Shanks 2009 MJA]
Strength: Aspects of Sexually Transmitted Infection (STI) Prevention

- Improved provision of recreational options eg, soldiers clubs (some settings) – probably reduced sex worker contact.

- Access to condoms – at canteens & free (albeit only from 1917)

- One report: after free condom provision the VD rate in NZEF in the UK in 1918 declined from: 3% to 1.5% [Carbery 1924]
Strength: Prevention & Treatment of STIs

• Provision of DIY treatments [Carbery 1924] – some antibacterial properties

• Provision of facilities for post-sex disinfection

• Fear-orientated “health education” on the hazard – possible deterrent for some?

“For Army use only”
Strength: Response to the meningitis outbreak (Trentham Camp)

• Successful breakup of the camp in 1915 ended the epidemic with no further spread (camp reduced to ¼ of the population) [Carbery 1924]

• Inquiry triggered improvements: drainage, roading, acceleration of building huts, limit on camp size (at 4000), permanent medical staff
Weakness: Initial overcrowding eg, Trentham (1915) & again at Featherston (1918)

Tents at Trentham (left) and huts at Featherston (but still extensive tent use at Featherston in 1918)
Weakness: Tahiti troopship outbreak, 1918

• Overcrowding
• Poor ventilation
• Inadequate quarantine
Tahiti troopship outbreak – pandemic influenza (77 deaths) [Summers et al 2010]
Mortality from pandemic influenza by accommodation type on the Tahiti troopship (1918) [Summers et al 2010]
Pandemic influenza mortality rates – NZEF in 1918 [Summers et al 2013]

- All Northern Hemisphere: 6.4
- Second Wave, Northern Hemisphere: 4.4
- Third Wave, Northern Hemisphere: 1.8
- France/Belgium: 3.6
- Egypt: 4.5
- United Kingdom: 8.1
- All Southern Hemisphere/Transit: 10.0
- New Zealand Discharged/Transit: 7.3
- New Zealand Military Camps: 17.2
- Narrow Neck Camp, Auckland: 3.9
- Featherston Camp, Wairarapa: 20.4
- Awapuni Camp, Palmerston North: 22.1
- Trentham Camp, Upper Hutt: 23.5
- Troopship HMNZT Tahiti: 68.9

Cumulative deaths per 1,000 (pandemic influenza)

- Specific Outbreaks
- Overall Estimates
Weaknesses?: Response to the influenza pandemic 1918

• Not promptly closing the military camps (in contrast to some successful isolations in NZ) [Rice 2005] [Wilson et al 2005]

• But such prompt action rare internationally (US military: naval base, San Francisco [Markel et al 2006] & American Samoa)

• More widespread use of the mixed bacterial vaccine may have helped prevent deaths in the Feb/March wave in Europe in 1919.
Weakness?: Response to the influenza pandemic

- Promptly closing Featherston camp – might have prevented the estimated 163 deaths

Epidemic curve for this outbreak [Sertsou et al. 2006]
Pandemic Influenza deaths amongst NZEF personnel (1918-1919) [Summers et al 2013]
Gallipoli: multiple problems

Over 200 disease deaths (dysentery)

- Poor nutrition
- Poor hygiene
- Insufficient medical services
Nutrient levels of the Gallipoli rations vs modern recommendations for vitamins impacting on immune function; and showing a slightly improved ration with some fruit & vegetables.

- **Vitamin C**: Recommended for disease prevention.
- **Vitamin A**
- **Vitamin E**

Legend:
- **Actual Gallipoli ration**
- **Modelled - some canned fruit & veg (50% less beef)**

[Wilson et al 2013 NZMJ]
Gallipoli: lack of water → poor hygiene
Weaknesses: Other aspects of STI control

- “Punitive” and degrading approach with punishment [Kampf 2008] → possibly reduced treatment seeking

- Apparent excessive focus on the women eg, “brothel inspections” in France (false reassurance of risks?)

- Inadequate alcohol control? → probably increased risk of sex/unsafe sex?
Conclusions (i)

- **Strengths:** vaccine use (some innovative); malaria control; Trentham outbreak control; aspects of STI prevention (condoms).

- **Weaknesses:** overcrowding of camps & troopships; inadequate quarantine (Tahiti) & camp closure; Gallipoli (nutrition, hygiene, medical services); other aspects of STI prevention.
Conclusions (ii)

• More research could better clarify these issues but it appears that careful planning (using knowledge of the time) could probably have prevented some of the infectious disease burden – perhaps even hundreds of deaths (especially influenza and dysentery).