Lessons for Zoonotic Disease and Vector Eradication - from past successes in New Zealand

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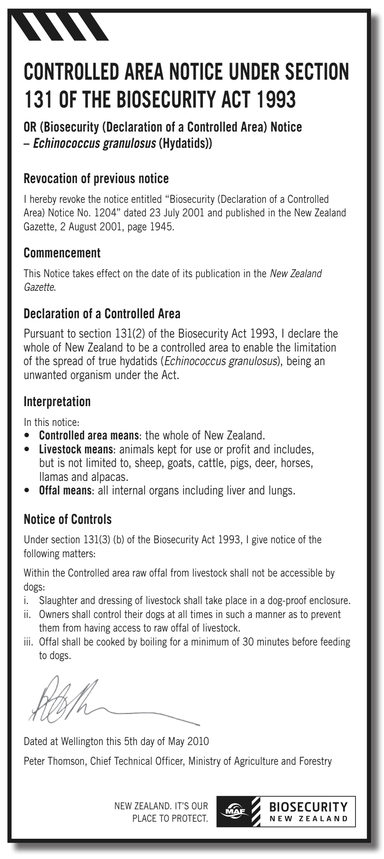
Introduction

Regional and global disease eradication remains attractive for epidemiologists and policy-makers.[1] For New Zealand (NZ), we searched the literature for documents from the relevant government agencies, and communicated with officials involved in past eradication efforts to identify common lessons.

Findings

Hydatids: In NZ in the early 20th century, hydatids had relatively high human infection rates[2] and large economic impacts on the sheep industry. Key aspects of the successful eradication programme included:

- Government-sponsored education of farmers which provided the impetus for the National Hydatids Act of 1959.[3] This legislation instituted the National Hydatids Council which allowed industry, pet owners and government to collectively devise and drive eradication efforts.[3]
- The Council initially instituted compulsory testing and treatment of dogs with arecoline hydrobromide. This on-the-spot testing provided an opportunity to educate dog owners.[4] Subsequently regular anthelmintic treatment of dogs became the mainstay of treatment.[5]
- Surveillance continued throughout the programme; sheep offals were monitored to allow targeted investigation of dogs from affected properties and restrict livestock movement from infected flocks.[5]
- Department of Health campaigns in the print media and in films were used to increase awareness of hydatids and risk reduction.[2]



CONTROLLED AREA NOTICE UNDER SECTION 131 OF THE BIOSECURITY ACT 1993

OR (Biosecurity (Declaration of a Controlled Area) Notice – *Echinococcus granulosus* (Hydatids))

Revocation of previous notice

I hereby revoke the notice entitled "Biosecurity (Declaration of a Controlled Area) Notice No. 1204" dated 23 July 2001 and published in the New Zealand Gazette, 2 August 2001, page 1945.

Commencement

This Notice takes effect on the date of its publication in the *New Zealand Gazette*.

Declaration of a Controlled Area

Pursuant to section 131(2) of the Biosecurity Act 1993, I declare the whole of New Zealand to be a controlled area to enable the limitation of the spread of true hydatids (*Echinococcus granulosus*), being an unwanted organism under the Act.

Interpretation

In this notice:
- **Controlled area means**: the whole of New Zealand.
- **Livestock means**: animals kept for use or profit and includes, but is not limited to, sheep, goats, cattle, pigs, deer, horses, llamas and alpacas.
- **Offal means**: all internal organs including liver and lungs.

Notice of Controls

Under section 131(3) (b) of the Biosecurity Act 1993, I give notice of the following matters:

Within the Controlled area raw offal from livestock shall not be accessible by dogs:
i. Slaughter and dressing of livestock shall take place in a dog-proof enclosure.
ii. Owners shall control their dogs at all times in such a manner as to prevent them from having access to raw offal of livestock.
iii. Offal shall be cooked by boiling for a minimum of 30 minutes before feeding to dogs.

Dated at Wellington this 5th day of May 2010

Peter Thomson, Chief Technical Officer, Ministry of Agriculture and Forestry

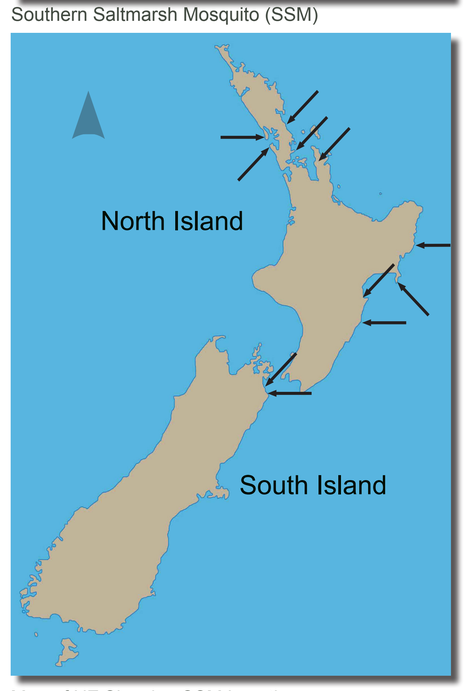
NEW ZEALAND. IT'S OUR PLACE TO PROTECT. BIOSECURITY NEW ZEALAND

Hydatids Controlled Area Notice

Invasive mosquito: The discovery of the southern saltmarsh mosquito in NZ in 1998 raised public health concerns (eg, this mosquito can potentially spread Ross River fever). Key aspects of the successful eradication programme included:

- Cross-government agency action with cooperation from local government, landowners, residents, Māori communities and environmental groups.
- Involvement of entomological expertise from Australia[8] and the USA.
- Spraying of sites with live larvae with Bti (Bacillus *thuringiensis israelensis*), treatment of infested areas with S-methoprene granules, and habitat management.
- Intensive surveillance activities at all likely mosquito habitat.
- Sustained funding commitment by Government supported by robust technical and scientific advice, health impact assessments and cost-benefit analyses.

Southern Saltmarsh Mosquito (SSM)



Map of NZ Showing SSM Locations

Brucellosis: The support for brucellosis eradication in NZ came primarily from the economic impact on agricultural exports[6] but there was also a significant risk to human health.[7] Key aspects of the successful programme included:

- A compulsory national elimination programme began in 1972 based on standardised serologic testing at a central laboratory.[6]
- Serologic assessment was bolstered by on-going surveillance systems; compulsory veterinary assessment of bovine abortions and bulk milk testing of low risk herds.[7 6]
- In the later stages of the programme, cattle movement was restricted to prevent spread from subclinically infected herds.[7]
- Funding was initially provided by the Government but became self sustaining based on levies from within the programme.[7]

Introduced mammalian pests: For conservation reasons, NZ has eradicated rodents from more than 90 islands[9] and numerous other introduced mammalian pests (possums, rabbits, etc) have also been eradicated from these islands.[10] Key aspects of the eradication efforts include:

- Having a clear goal of eradication (rather than control).
- Robust and meticulous planning which involved research, contingency measures, incorporation of best available tools and techniques, risk management considerations, and the flexibility to cope with unexpected difficulties.[11]
- Having an adaptive management approach and learning from previous eradication projects (both successes and failures).

Brushtail Possum

Key lessons

These various eradication programmes cover very different organisms: parasites, bacteria, mosquitoes, and mammalian pests. Nevertheless, some of the major lessons identified are of note:

- Having a clear goal of achieving eradication.
- Understanding the disease/vector ecology and the points of intervention.
- Having effective tools available to achieve eradication.
- Securing long-term funding and collaboration across government agencies (agriculture, biosecurity, and health).
- Having cooperation and input from the public, non-government organisations, local government, and indigenous communities (Māori in NZ).
- Having well-planned and well-resourced campaigns that are sustainable for long periods (even decades).
- Having detailed surveillance systems to guide refinements of eradication efforts and to confirm success.
- Utilising strong technical and scientific information to underpin operational actions.
- Implementing a comprehensive communications strategy that can ensure that national and local stakeholders are kept informed and actively involved with the programmes.

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