Emerging sources and pathways for leptospirosis: research methods and interim results

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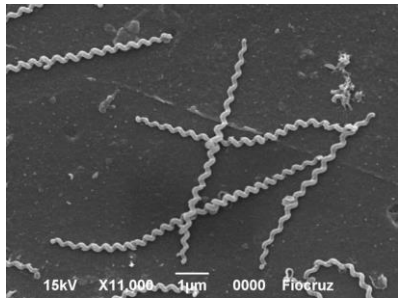
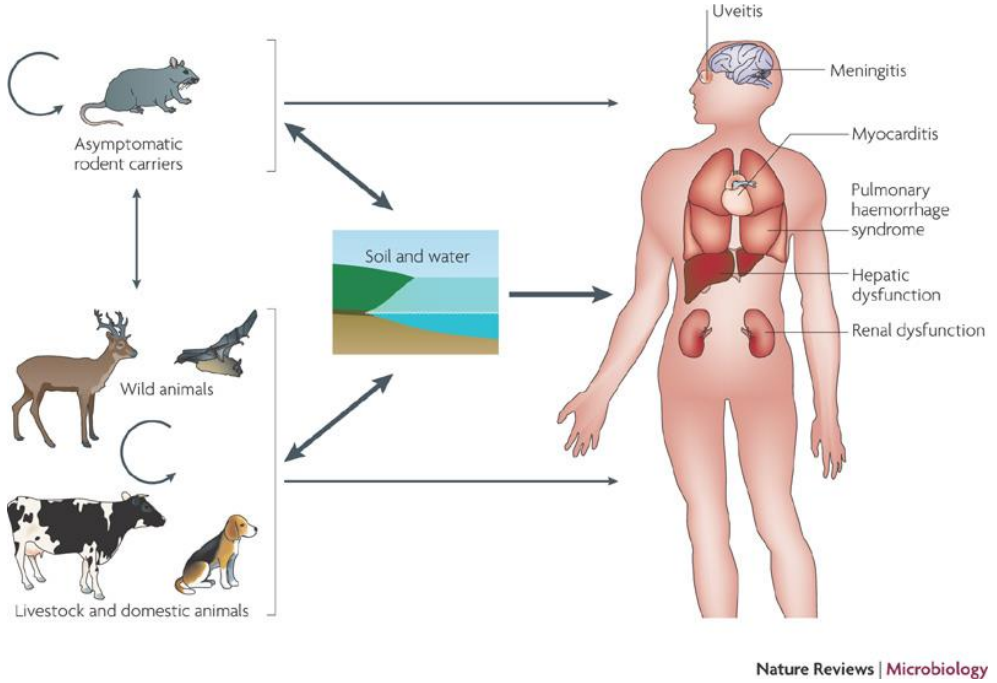
Leptospirosis



Leptospira - 64 species, over 300 serovars

Leptospira borgpetersenii
Leptospira interrogans



In New Zealand

- High-risk occupations
- Animal vaccines don't cover all strains
- Change in demography
- Increase in cases
- Sick for long term
- Difficulty getting compensation

Address gaps in leptospirosis knowledge

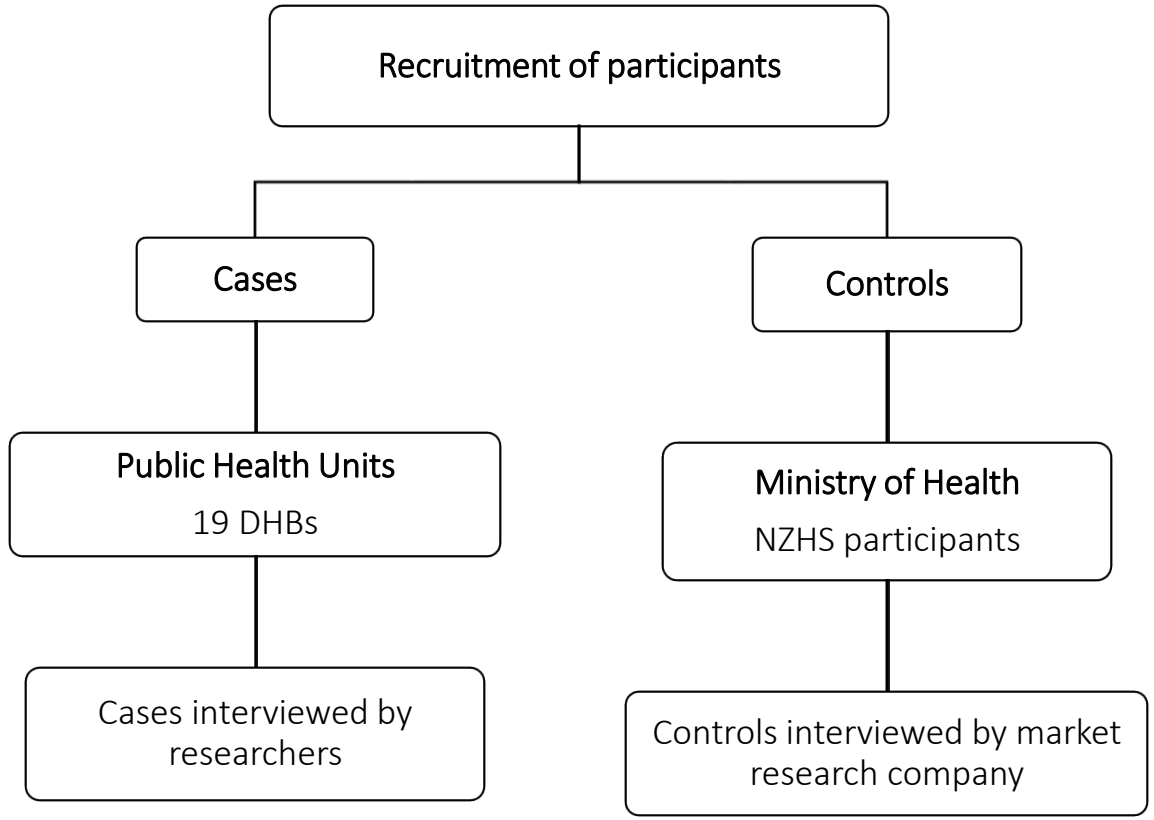
- identify infection risk factors, sources/pathways and assessment criteria for ACC
- Inform intervention and control strategies

Emerging Sources and Pathways for Leptospirosis - a paradigm shift

1. **Identify risk factors associated with acute leptospirosis**
   - ❑ Nationwide case-control study
2. Assess burden and compensation
   - ❑ 6-month follow-up interviews
3. Gather experience of high-risk occupations (farmers and meat-workers)
   - ❑ Semi-structured interviews
4. Identify pathogenic strains of *Leptospira* causing disease in NZ
   - ❑ Sampling patients
5. Identify sources and pathways of infection
   - ❑ Sampling patients in-contact animals and environment
6. Establish a cohort of patients for long-term follow-up

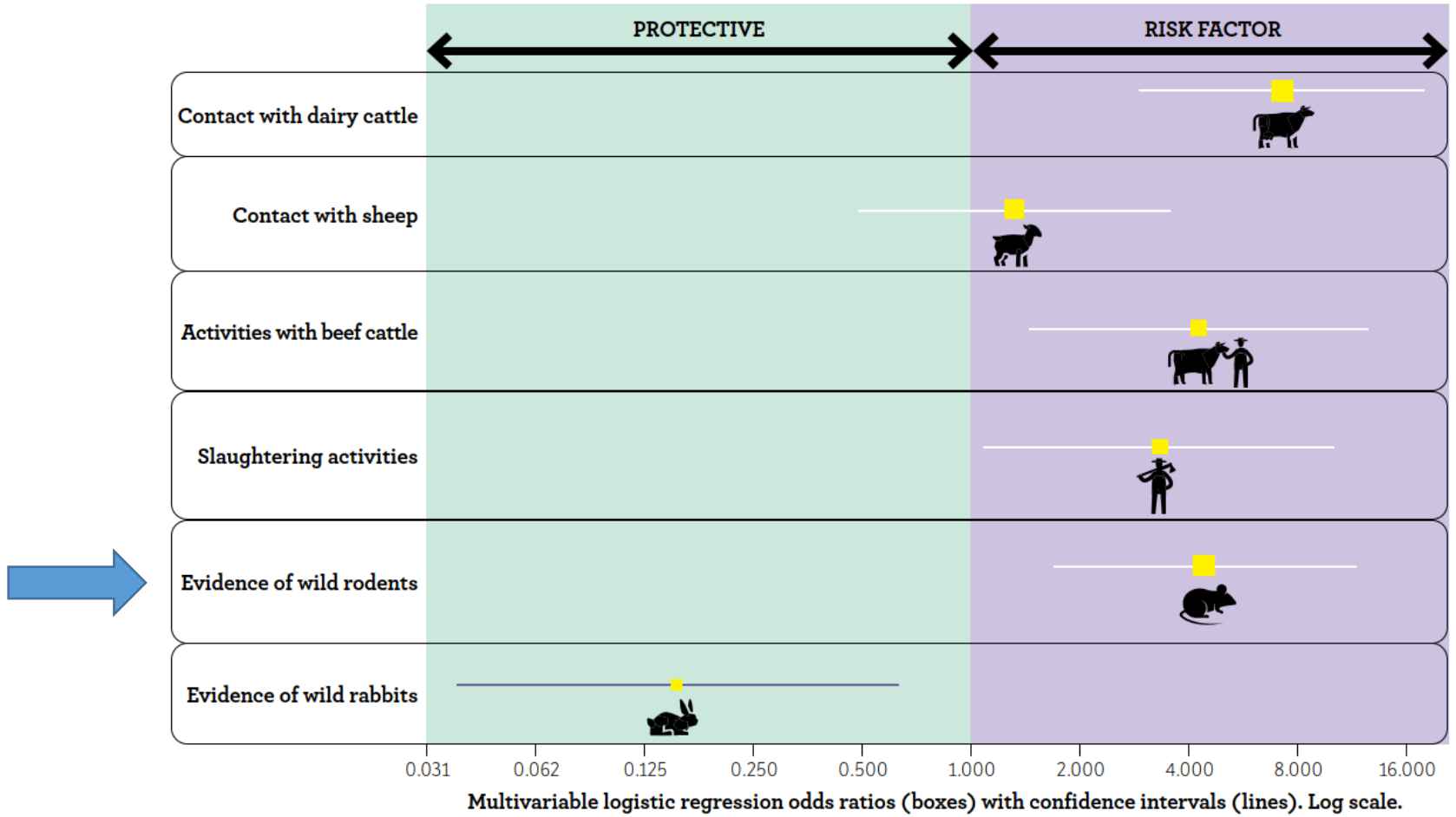
Aim 1: Identify risk factors associated with acute leptospirosis - method

- Nationwide recruitment – 30 months
  - September 2019 to January 2022
- 150 cases and 300 controls
  - matched on sex and rurality
- Telephone survey - 80 questions
  - Demography, animal exposures, environmental exposures, other exposures
  - 20 questions - health status, clinical course and outcome, emotional wellbeing



Factors associated with acute leptospirosis

67 cases and 150 controls



Aim 2: Assess burden and compensation

Method

- Follow-up telephone survey (45 questions)
  - Symptoms –types, duration, severity
  - Impact on work and social life
  - Costs associated with the illness
  - Workplace compensation
  - Emotional wellbeing

Results

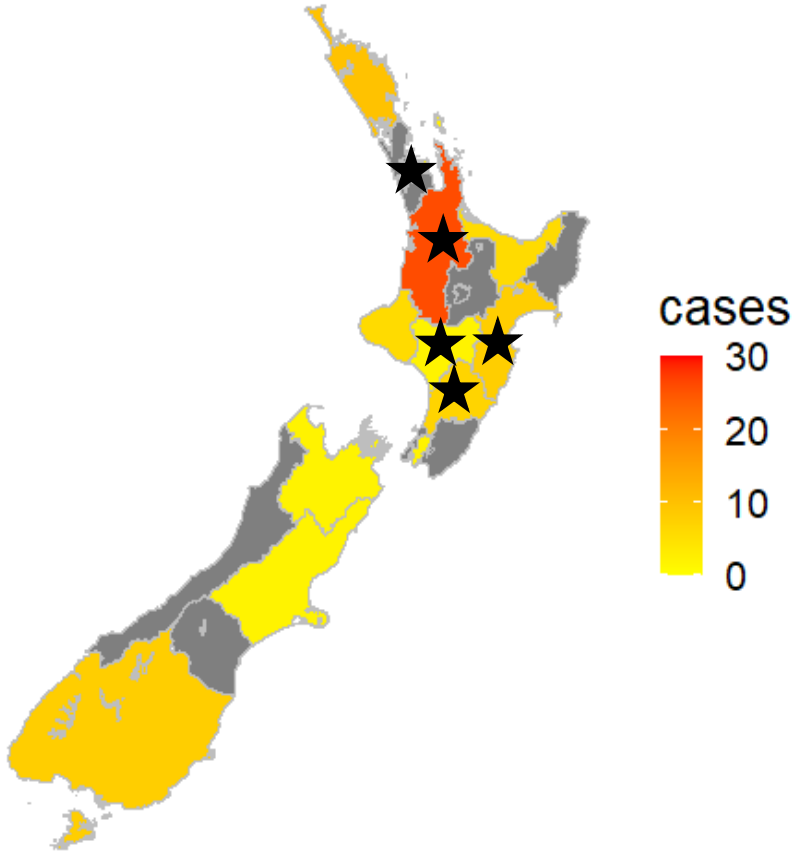
- 67% (55/82) of cases hospitalized
- 61 follow-up interviews (~ 9 months)

Symptoms reported	Persistent symptoms (%)
Fatigue	46
Headache	16
Light sensitivity	16
Back pain	13
Leg pain	10
Nausea	8
Sore eyes	8
Abdominal pain	7
Cough	3
Diarrhoea	2

Aim 6: Establish a cohort for a subsequent study

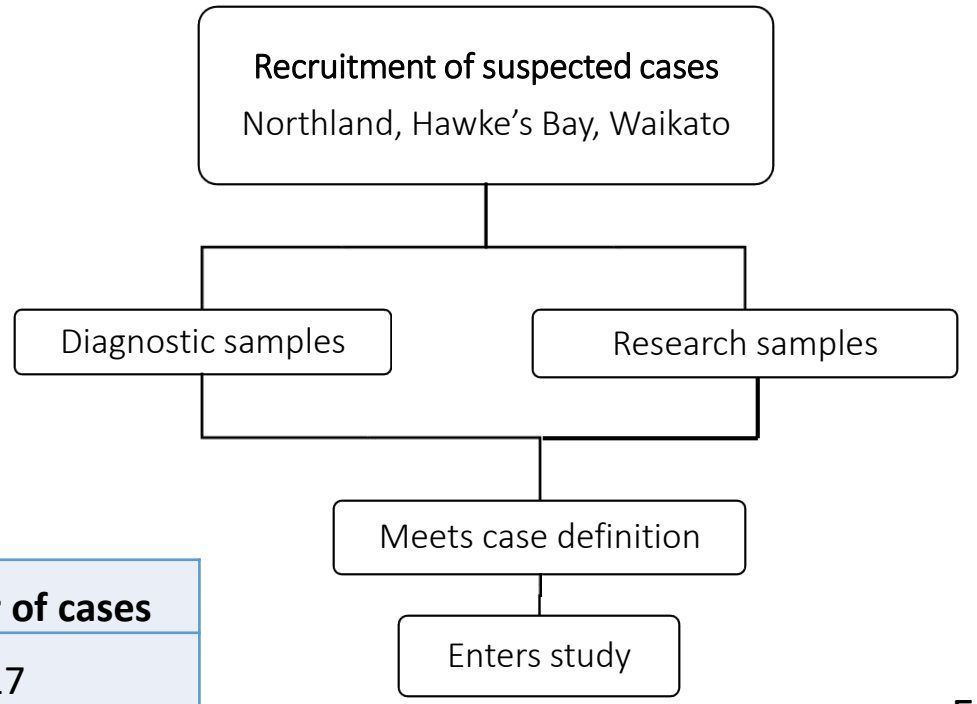
Aim 3: Gather patient experiences and views

- Semi-structured face-to-face interview and telephone/zoom interviews
  - Farming and meat working occupation
    - Experience with leptospirosis
    - Workplace compensation
    - Advice from patient
- 65% (53/82) cases qualify
  - 10 interviews done to-date
  - Demography
    - Sex: 7 males, 3 females
    - Ethnicity: 8 European, 2 Māori
    - Occupation: 7 farmers, 3 meat worker



Aim 4: Identify pathogenic strains of *Leptospira* causing disease in New Zealand

- Serology (8/300 serovars)
- PCR (positive/negative)



- Serology
- Speciating PCR
- Culture (WGS)

Suspected cases	Number of cases
Recruited	17
Positive to research test	13 (76%)
Positive to diagnostic test	4 (24%)
Number not tested	12 (70%)

Enhancing leptospirosis diagnosis is subject to future work

Aim 5: Identify sources and pathways of infection

Method

- If acute survey reveals a stable animal/environment exposure, animal and environmental sampling
  - Livestock
  - Pets
  - Wild animals
  - Environment

- Compare bacteria infecting patient versus bacteria found in patients animals and environment
  - Provide information on sources and pathways for infection
  - Can be used to place intervention and control measures

Results

- 3 case studies
  - Dairy farm - Northland
  - Beef farm - Northland
  - Sheep and beef farm - Canterbury

Animal	Dairy cow
Pomona	1536
Tarassovi	24
Ballum	48
Hardjo	24
Copenhageni	24
Urine PCR	Positive
Sequence	Ballum

Consultation with farmer and their veterinarian

trap.nz

Traps

Active/Retired Active

Title Starts with...

Trap type - Any -

Tags

Items per page 50

Show results | Reset

Click **Show results** to see all stations listed as a table below the map. You can use the filters to narrow the results.

trap.nz

Date	Trap	Trap type	Status	Rebaited	Re-baited with	Bait details	Recorded by	Strikes	Species caught	Trap condition
4 Nov 2021 - 01:34	9	Leg hold trap	Sprung	Yes	None			1	Possum	OK
5 Sep 2021 - 01:59	12	Timms	Sprung	Yes	None			1	Possum	OK
27 Aug 2021 - 01:54	9	Leg hold trap	Sprung	No	None			1	Rabbit	OK
25 Aug 2021 - 01:39	10	SA Possum	Sprung	Yes	None			1	Possum	OK
24 Aug 2021 - 01:52	12	Timms	Sprung	Yes	None			1	Possum	OK
18 Aug 2021 - 01:57	4	Victor	Sprung	Yes	None			1	Rat	OK
18 Aug 2021 - 01:47	t14	Cage Trap	Sprung	Yes	None			1	Rabbit	OK
13 Aug 2021 - 08:37	5	DOC 200	Sprung	No	None			1	Rat	OK
13 Aug 2021 - 08:29	10	SA Possum	Still set, bait bad	No	None			0	None	OK
13 Aug 2021 - 08:25	8	Leg hold trap	Still set, bait bad	No	None			0	None	OK
13 Aug 2021 - 01:49	t11	DOC 200	Sprung	Yes	None			1	Rat	OK
12 Aug 2021 - 01:15	t12	Victor	Sprung	Yes	Peanut butter			1	Rat	OK
7 Aug 2021 - 08:50	Possum	Timms	Still set, bait bad	No	None			0	None	OK

Acknowledgements

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Thank you ☺

Questions?

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