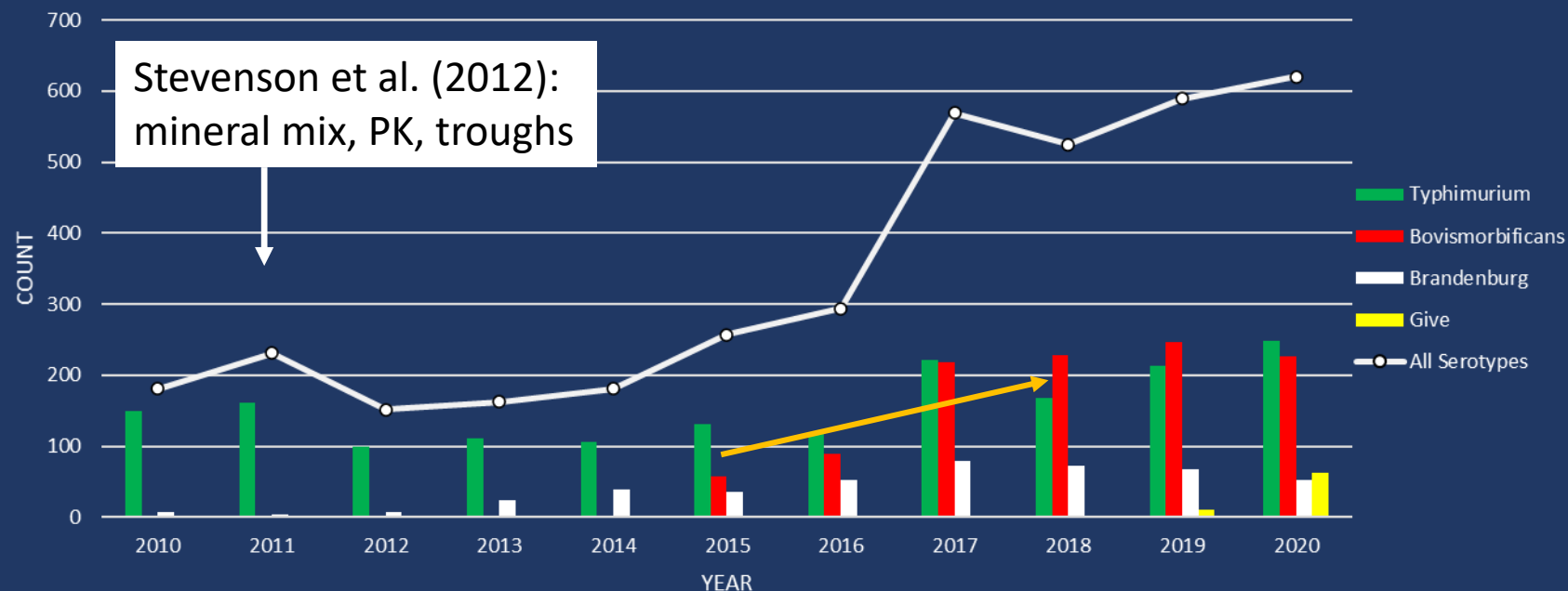# Salmonella Bovismorbificans emergence in dairy herds

Cord Heuer, Chris Compton

Agenda

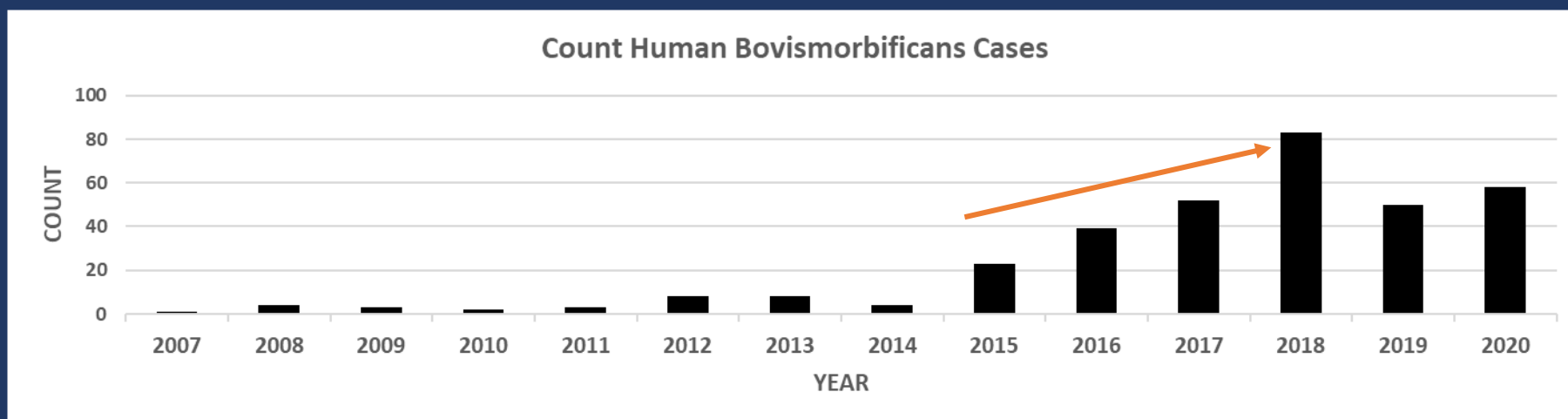- Bovismorbificans in context

- Case control study

- Further queries

MPI Animal Health Surveillance 2010-2020

Stevenson et al. (2012): mineral mix, PK, troughs

ESR Public Health Surveillance 2014 -2018
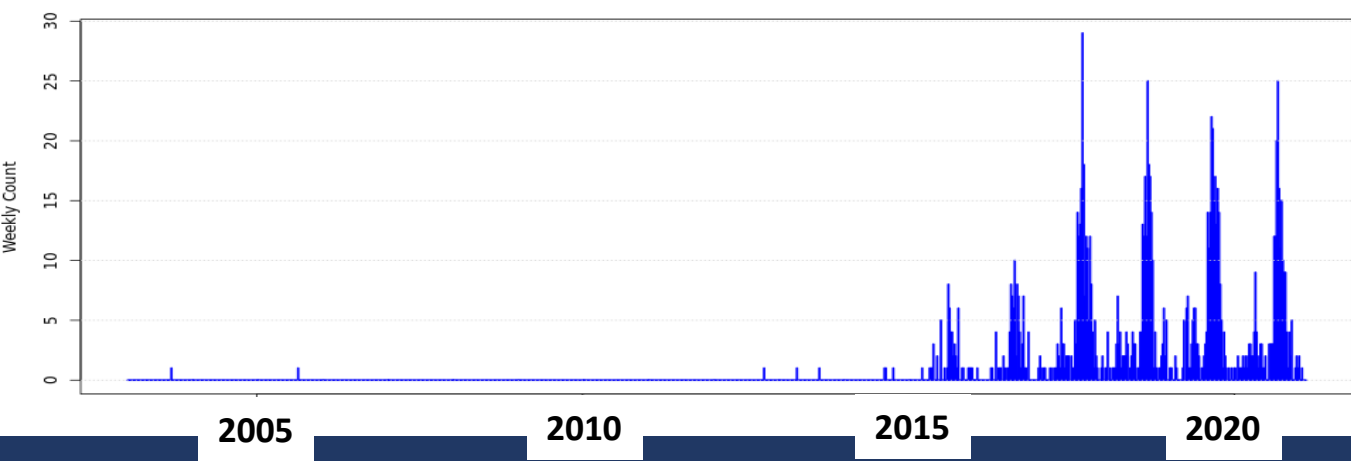
Count Human Bovismorbificans Cases

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Emergence of Salmonella ST Bovismorbificans

Why did Brandenburg stay in SI but Bovism. spread across NI+SI?

Incidence rates of laboratory submissions with Salmonella bovismorbificans in cattle (dairy/beef)

S. Bovismorbificans 2005 – 2021
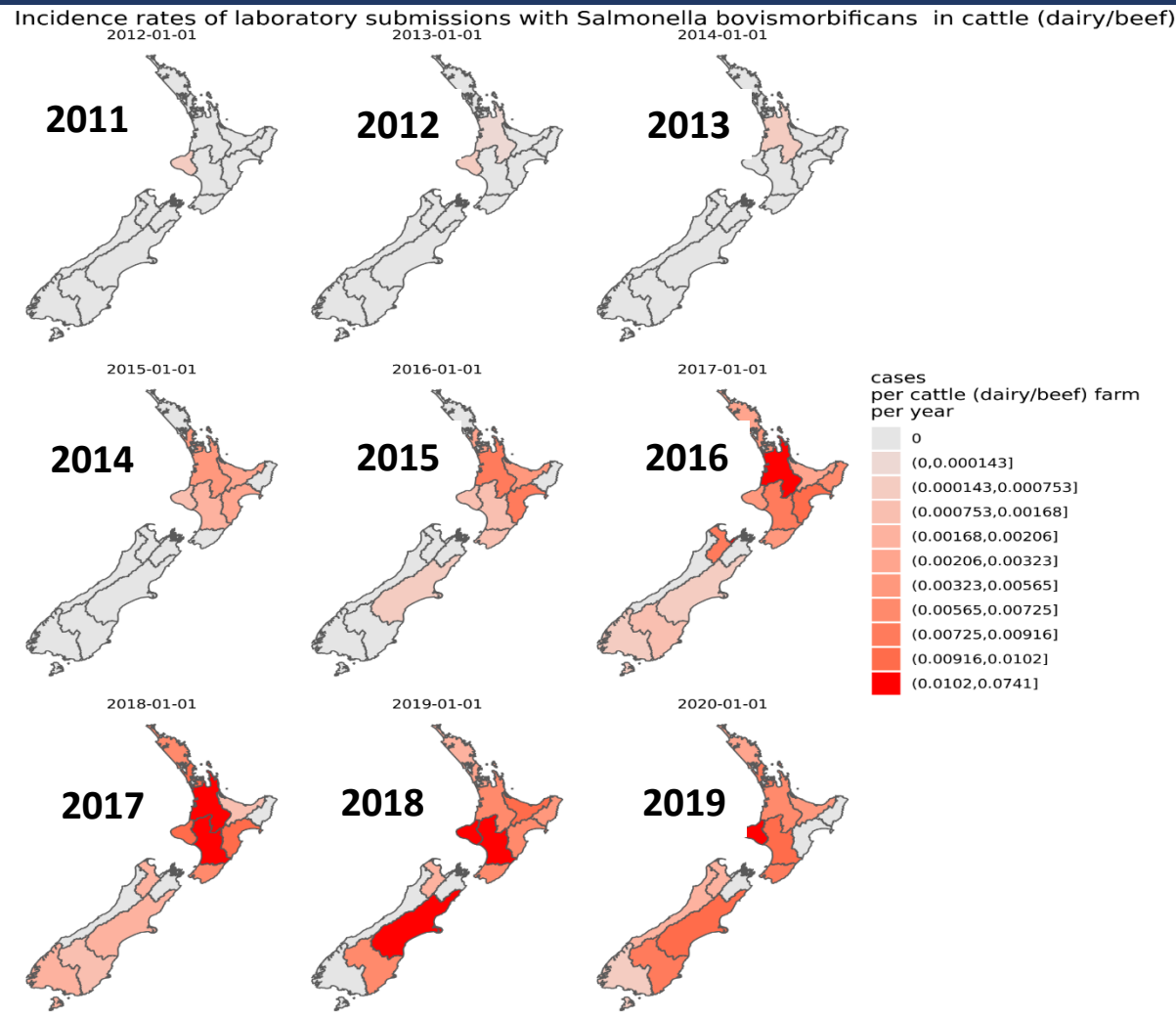
Context

- Overseas: sources of human infections *S. bovismorbificans*
  - Food (ham, sprouts, hummus, lettuce)
  - Contact with pigs, cattle, layer and broiler chicken
- NZ: food, travel, farm animals, water *Salmonella* STs
  - Survival up to 28 weeks in effluent ponds

Source: ESR

Table 22. Exposure to risk factors associated with salmonellosis, 2018

| Risk factor	Yes	No	Unknown	Percentage (%) [a]
Consumed food from retail premises	314	359	427	46.7
Travelled overseas during the incubation period	353	554	193	38.9
Contact with farm animals	204	517	379	28.3
Recreational water contact	187	514	399	26.7
Consumed untreated water	155	433	512	26.4
Contact with faecal matter	93	570	437	14.0
Contact with other symptomatic people	86	631	383	12.0
Contact with sick animals	42	611	447	6.4

[a] Percentage refers to the number of cases that answered "yes" out of the total number of cases for which this information was known. Some cases had more than one risk factor recorded.

Case control study: objectives

- Non-Brandenburg Salmonella STs

- Identify factors associated with outbreaks on:
    - Calf morbidity/mortality
    - MA cow morbidity

- Two components:
    - Retrospective case control 2019 – 2021
    - Prospective case control from spring 2021

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Case control study: cases

MA cow morbidity Lisa Hulme-Moir

Case herds: MA cows

- Case definition:
  - > 5% cow morbidity (acute diarrhoea, systemic illness, abortion), short period
  - >10% calf morbidity (acute diarrhoea /dehydration, death), short period
  - BOTH: confirmed by isolation of S. Bovismorbificans

- Case identification (n = 47 herds per age group):
  - 1 – Laboratory referrals: commercial and vet-clinic-labs
  - 2 – Veterinary referrals: VetScript, DCV-Newsletter etc.
  - 3 – Milk processor referrals
  - Ethics: contacting vets and farmers about outbreak history for enrolment
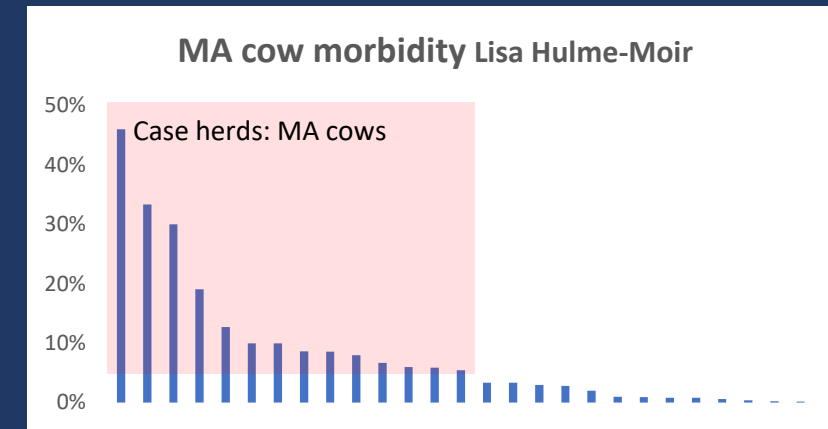
Case control study: controls

- Control selection (n = 94 herds, both calves and cows):
  - 2 farms per case:
    - one matched by region
    - the other randomly from population
  - Not meeting case definition
  - Similar herd size and calving pattern
  - Prospective cc: (pooled?) faecal culture
  - Sampling frame: dairy company lists or DairyNZ
  - Ethics: contacting farmers, collect exposure information

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More Queries:

- Endemic level: herds and animals
- Infection outcomes: latent vs. sporadic clinical vs. outbreak
- Sub-clinical production effects
- Is S. bovismorbificans ubiquitous? And if not:
  - Environmental vs. direct contact (movement) transmission
- Strain diversity and distribution:
  - Domestic and wild animal species
  - Environment
  - Food: animal and plant sources
- Are vaccine strains cross-protecting against endemic strains?

Acknowledgement

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  - MPI, EpiCentre, mEpiLab
  - Stakeholders
    - DairyCos, DairyNZ, FedFarmers, NZVA, RWNZ, Commercial Labs, MSD