

Emergence of a New *Leptospira* Strain Causes Public Health Concerns

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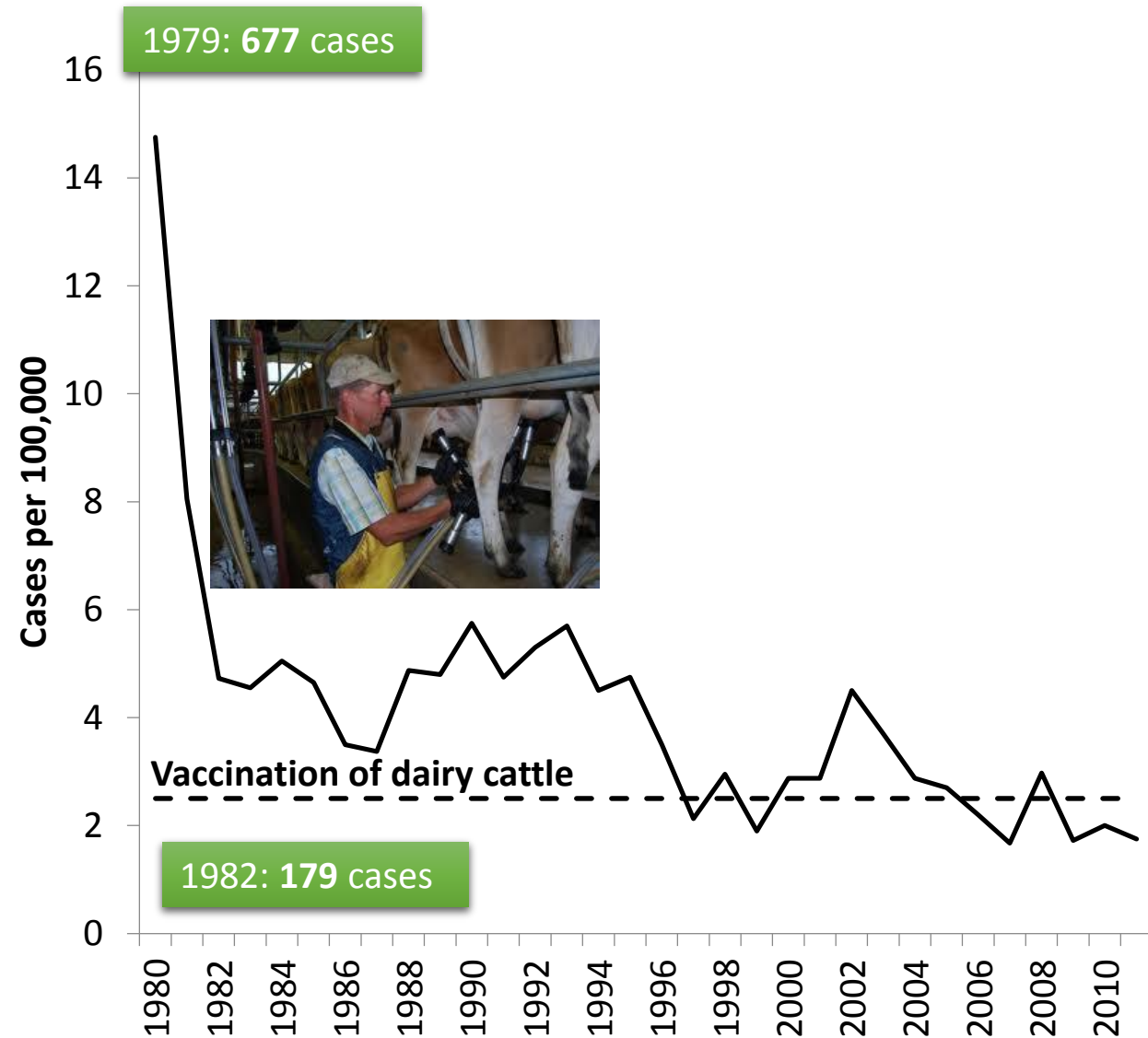


- **Human leptospirosis:**

- Flu-like signs, kidney colonisation
- ~100 notified cases per year since 1997
 - 62% farm workers
- Dairy: high exposure to urine at milking
- Serovars:
 - **In vaccines:** Hardjobovis, Pomona, Copenhageni (~ Icterohaemorrhagiae)
 - **Other:** Tarassovi, Ballum, Canicola, Australis
- Cases in dairy farmers despite vaccination

- **2011 pilot study in vaccinated dairy herds**

- 30% herds and 4% cows PCR+ (shedding)
- No serovar information

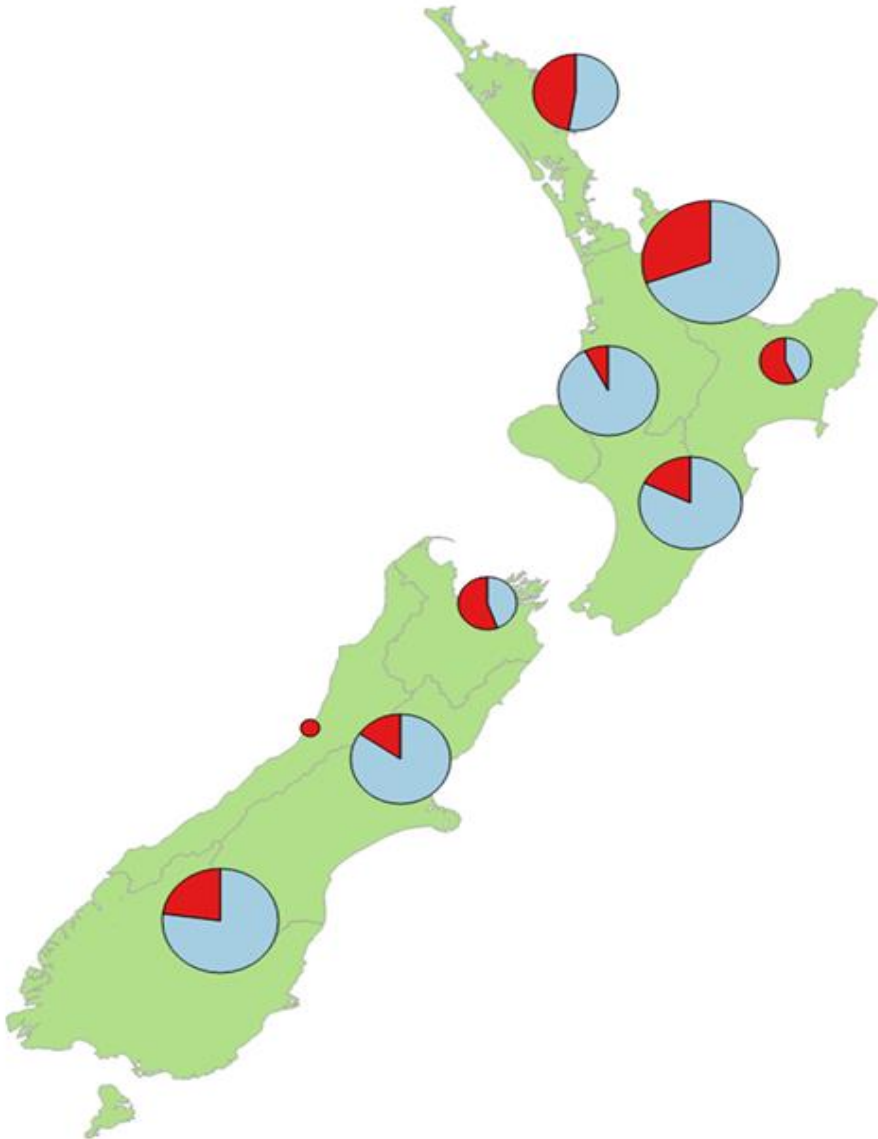


Cross-sectional: 200 farms

- January – March 2016
 - Random selection of herds
 - stratified by region and herd size
 - 20 cows per herd; MAT serology; urine PCR
- Results:
 - Herds: 27% shedding (CI: 20 – 33%)
 - Cows: 2.4% shedding (CI: 1.9% – 2.8%)

Serovar		Herds	Cows
Hardjobovis	vaccinated	99%	44%
Pomona	vaccinated	96%	28%
Copenhageni	vaccinated	16%	3%
Copenhageni	non-vacc	15%	1%
Tarassovi	non-vacc	74%	17%
Ballum	non-vacc	36%	3%

Herd level shedding

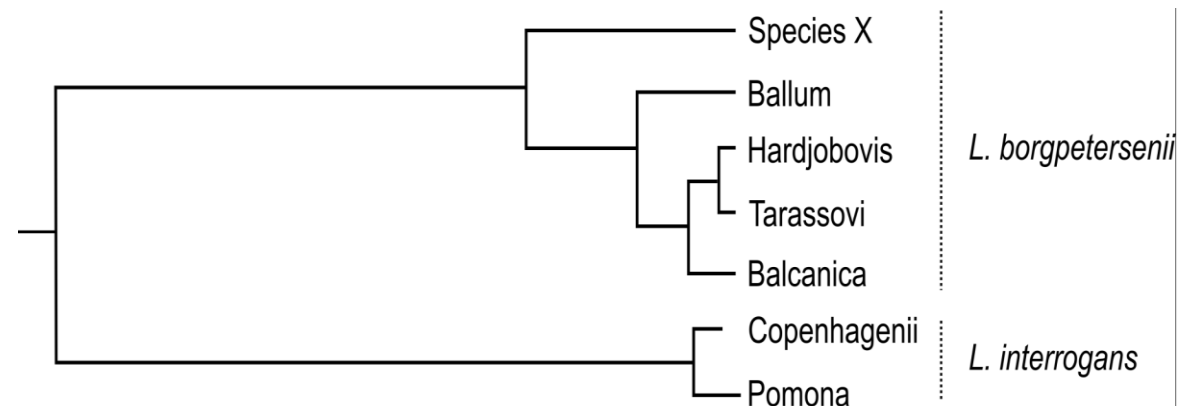
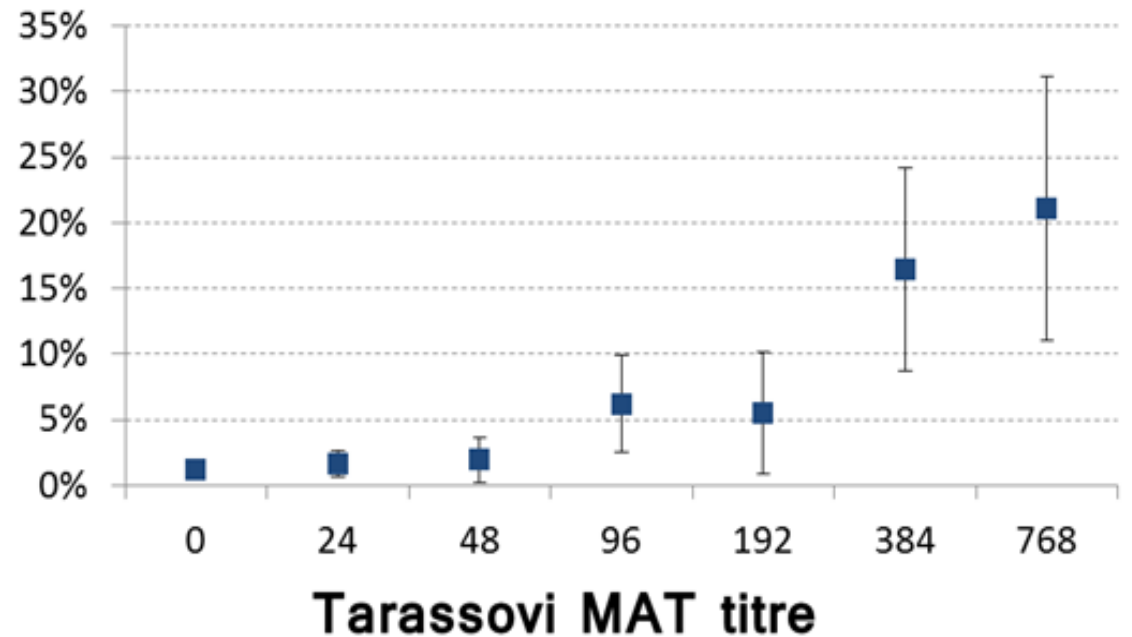


MAT type 'Tarassovi'

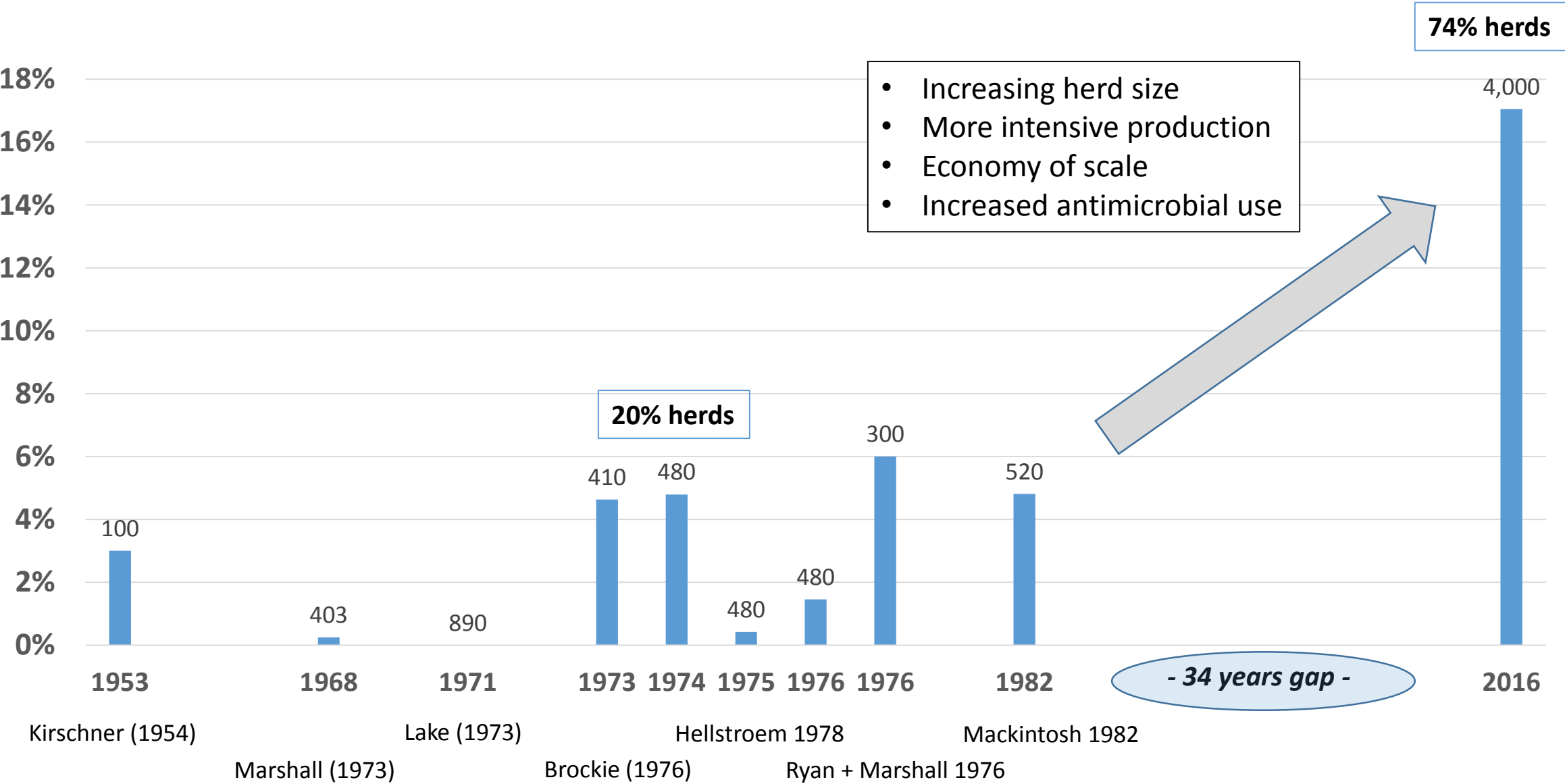
- Strong impact of Tarassovi on shedding

- **75 pos. urine samples:**

- PCR sequencing
- gyrase B amplicons



Emergence? Crude prevalence of Tarassovi in dairy cattle (n)



Tarassovi in notified human cases 2005 - 2010

- Cowie and Bell: NZMJ 27 July 2012, Vol 125 No 1358

Occupational group	Serovar case numbers (%)						Total	
	Ballum	Copenhageni	Hardjo-bovis	Pomona	Tarassovi	Unspecified		
Dairy farmer	5 (20)	1 (4)	5 (20)	0 (0)	11 (44)	3 (12)	25	33%
Farmer and farm manager	6 (17.6)	1 (2.9)	7 (20.6)	9 (26.5)	2 (5.9)	9 (26.5)	34	45%
Meat processor	0 (0)	0 (0)	5 (29.4)	10 (58.8)	1 (5.9)	1(5.9)	17	22%



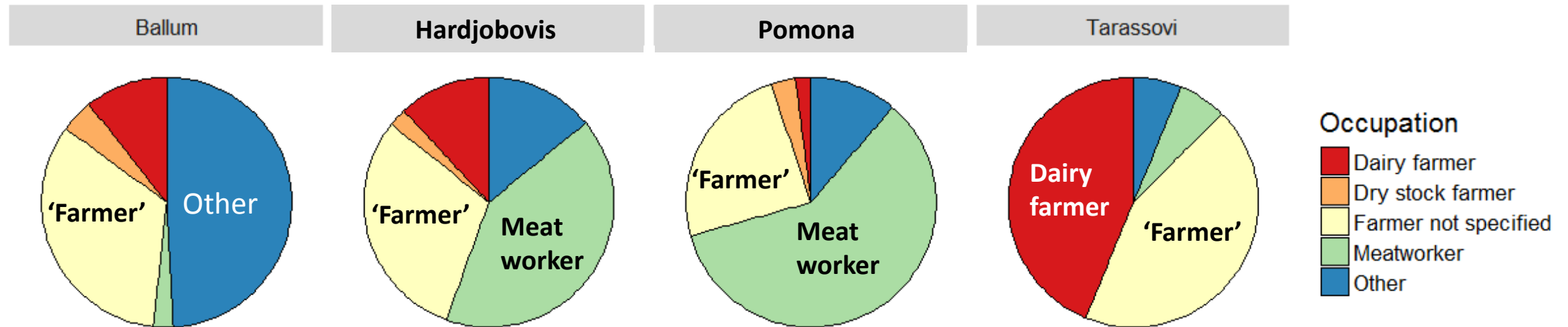
PR dairy vs non-dairy = 7.5 fold (p=0.004)

PR dairy vs meat proc. = 7.5 fold (p=0.028)

Public Health Surveillance data (ESR):

Occupation of 1,556 human cases 1999 – 2016

Shah et al. 2017



Conclusions:

- Vaccination against Hardjobovis, Pomona, Copenhageni effective
- However, a small percentage of cows (albeit 27% herds) continue to shed *Leptospira* and expose dairy workers
 - Tarassovi = main reason for shedding and disease in dairy workers
 - 75% herds with evidence of Tarassovi
 - More than half of 'Tarassovi' shedders are '*Agent X*'
- Emergence of a new Tarassovi strain in cattle [sheep, deer]
- '*Want*' to add Tarassovi to vaccines
 - Ongoing: isolation and whole genome sequencing

Acknowledgements

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- Dairy Farmers compliance
- DairyNZ random selection
- mEpiLab/EpiCentre Ahmed Fayaz, Neville Haack
- ESR providing access to human case data

