



A seroepidemiological study of bovine pestivirus in Queensland beef and dairy herds conducted in 1994/95

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Why the interest in controlling bovine pestivirus?

- Terminology – bovine pestivirus = bovine virus diarrhoea virus = mucosal disease virus
- See www.bvdiv-control.org
- Nordic countries in Europe working to freedom from bovine pestivirus
- Flow on to US/Canada – debating benefits of vaccination vs “zoo-sanitary” control
- Release of a commercial vaccine in Australia
- Lots of questions
- We had the data – old but still valid

Objectives

1. Estimate the proportion of Queensland cattle herds with one or more sampled cattle with detectable antibody to bovine pestivirus and to investigate whether this varied geographically
2. See if the seroprevalence of bovine pestivirus at the herd level was associated with herd size or average stocking density for the herd
3. Determine average annual incidence risk of bovine pestivirus infection
4. Estimate the overall individual level seroprevalence of bovine pestivirus in the Queensland cattle herd.

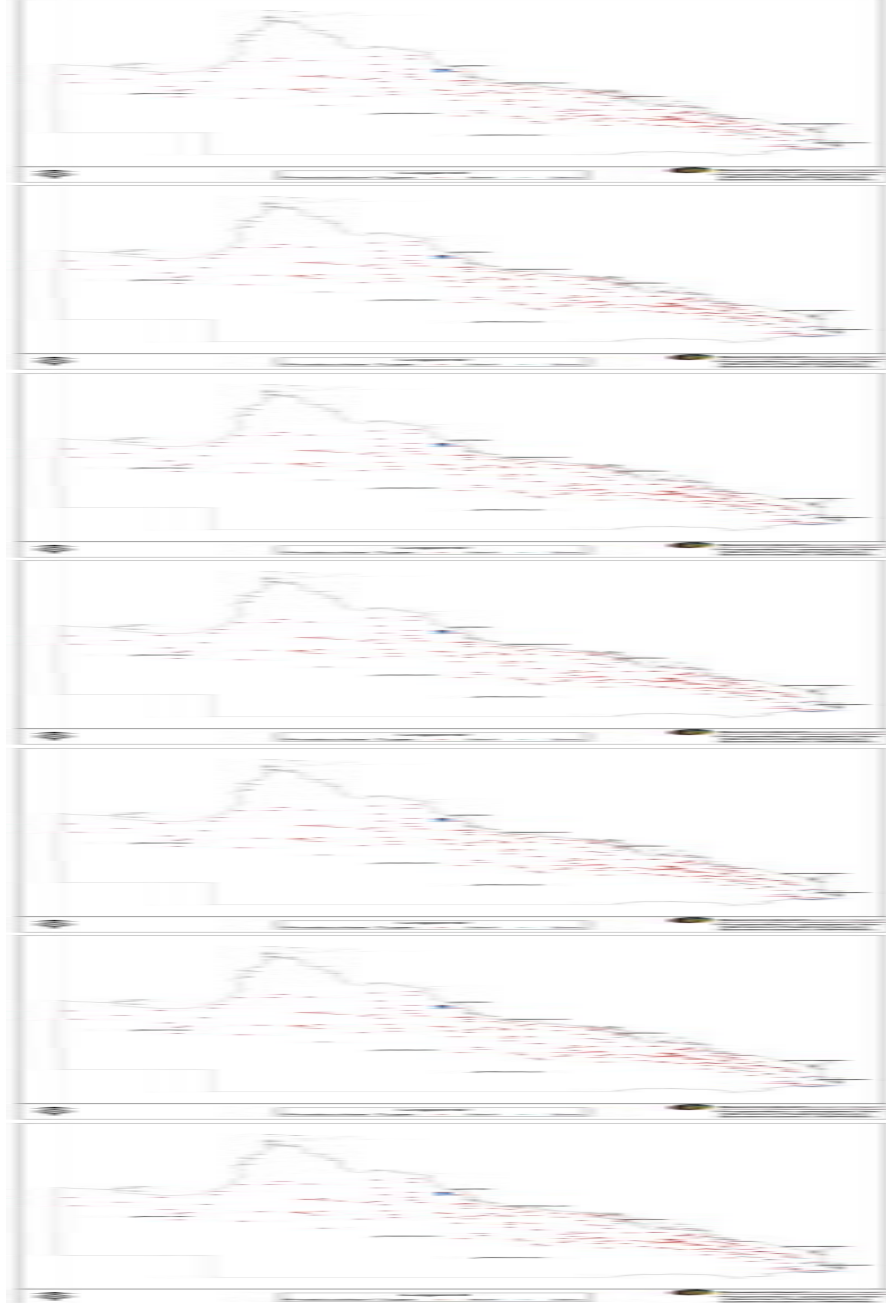
Sampling methodology

- Sampling frame was the Qld property registration database - APS
- Sampled “home bred” female cattle from herds with 50 or more cows - 7500 herds with 50 or more breeding females in the three regions of Qld sampled.
- A two stage sampling method was used, designed to be at least 95% certain of detecting at least one infected animal in herds with a prevalence of pestivirus infection of 10% or greater
- Herds were sampled at random from each local government area with sampling proportional to the number of cattle or herds in each shire.
- 15 young and 15 older cows selected from each selected herd and sampled (with variations but still 30/herd) as per Cannon and Roe.

Serological testing

- Antibodies to bovine pestivirus were detected using a virus neutralisation test performed according to Australian guidelines
- Assume 100% Se and Sp

Location of properties sampled



Total cattle numbers in sampled herds varied from 62-24,600 head

Total area of properties sampled varied from 50ha to 395,400ha

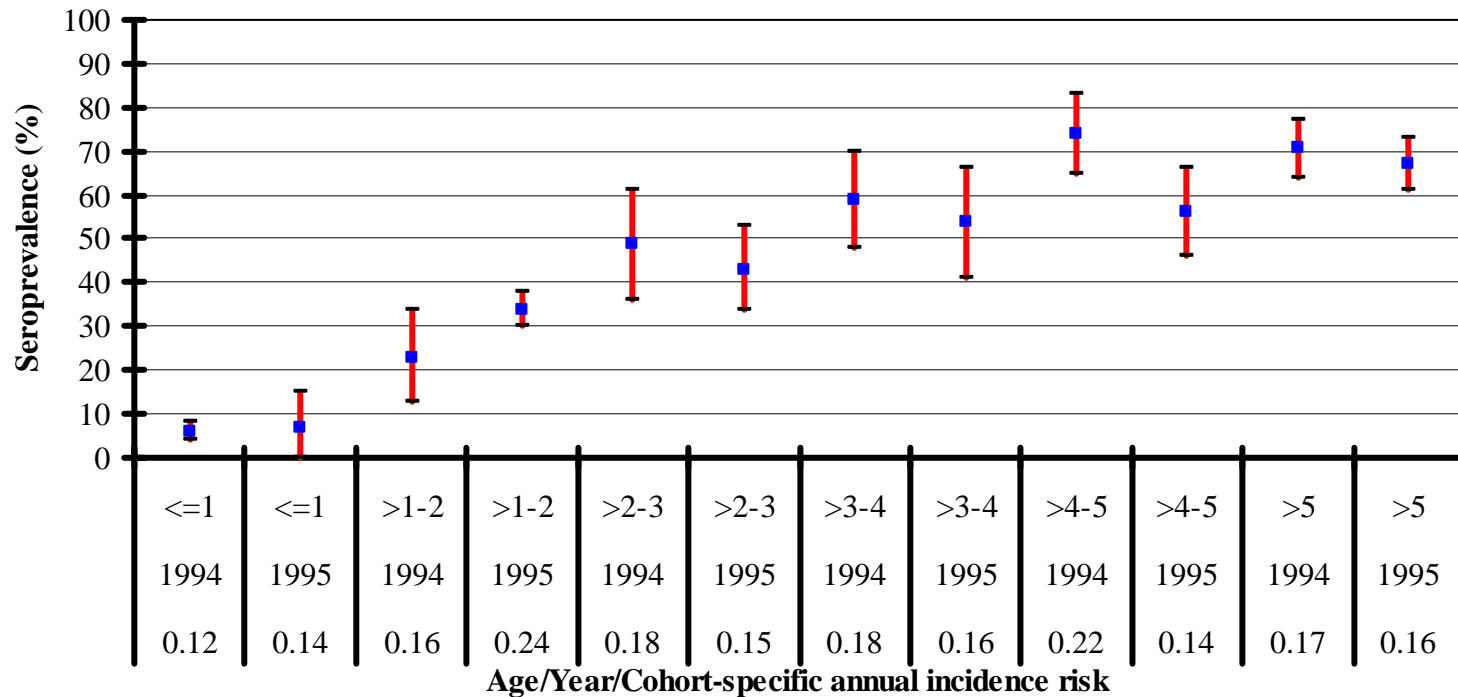
% herds where 0 seropositive

Type	Beef				Dairy			
Region ^a	North		Central		SE	SE	North	Total
Year sampled	1994	1995	1994	1995	1995	1995	1995	
Percentage of herds where heifers sampled were seronegative	41	36	28	37	36	62	43	38
Percentage of herds where all cattle sampled were seronegative	9	13	7	11	13	25	10	11
Total herds sampled	59	31	46	38	39	16	21	250

Seroprevalence by herd size

1. Trend for larger herds to have one or more animals seropositive for bovine pestivirus (χ^2 for Linear trend = 3.656, $p=0.056$).
2. Herds with greater than 500 head contained more seropositive animals than smaller herds. There were 86 of 103 herds with fewer than 500 head that contained one or more seropositive animals compared with 137 of 147 herds more than 500 head, giving a prevalence ratio of 1.12 and 95% confidence interval of 1.01 – 1.23 ($p=0.026$).
3. The 16 herds with more than 5000 head all contained one or more seropositive animals.

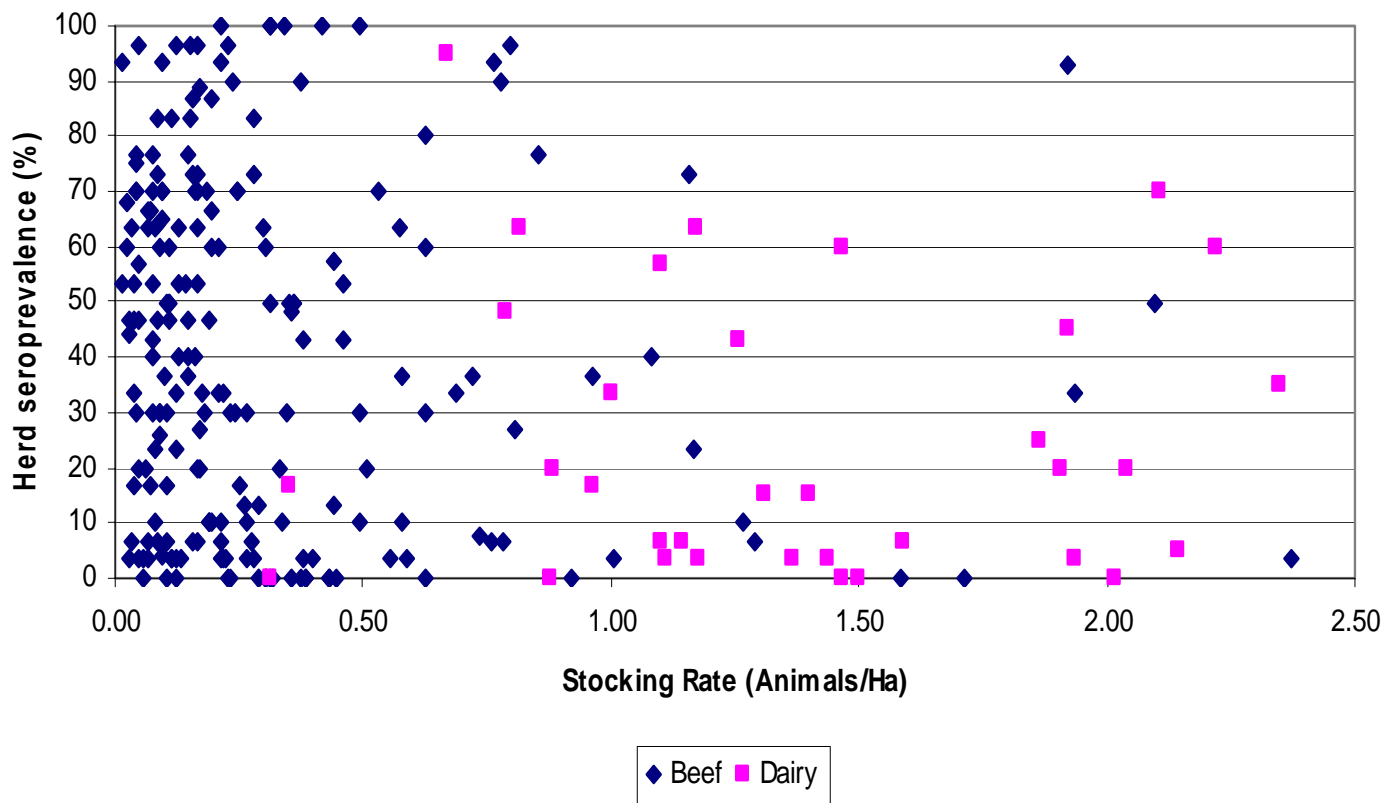
Age related seroprevalence



Average annual risk of infection with bovine pestivirus varied from 0.12 to 0.24 seroconversions per cattle year at risk.

Seroprevalence by Stocking density

Overall seroprevalence was 36%



Limitations of study design

- Non-random sampling within larger herds was a limitation
- Smaller numbers when heifers and cows looked at separately
- Calculation of average stocking density for irrigated dairy farms and crowding of cattle during yarding, supplementing etc on large properties.
- Calculation of av annual infection risk (no account of seronegative herds)

Conclusions

1. Infection is common in Qld herds BUT....
2. Relatively low average annual infection risk in Qld herds – many old cows still seronegative.
3. Herd size is more important than stocking density - larger herds (>500 head) appear to have *increased* risk of exposure.
4. Lower levels of exposure in dairy than beef herds – higher biosecurity due to EBL?
5. 10 to 40% of cattle herds in Qld do not appear to have active infection occurring.

