

## Pestivirus

– what might it mean to your herd?



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# What do we know about Bovine Pestivirus?

- Bovine Pestivirus = Bovine Viral Diarrhoea virus (BVDV)
  - Occurs worldwide
  - Been around for centuries (1483), but....
- ..... clinical manifestations only described in 1946 in USA  
(Olafson et al).

# Financial impact on Australian cattle industry

- Estimated to cost Australian producers - \$114.4m pa\*
- Southern Australian industry - \$63.5m pa\*

\*

Lane, J., Jubb, T., Shephard, R. Webb-Ware, Fordyce, G. Priority list of endemic diseases for the red meat industries. MLA report B.AHE.0010, (2015).

# Impacts of infection with BVDV Type 1a/1c

- Naïve mature animal: Transient infection (TI)  Immune

- Naïve Pregnant Dam:



poor fertility - breeding period  
embryonic death and abortion  
development of PI calf (1<sup>st</sup> trimester)  
foetal deformities (2<sup>nd</sup> trimester)  
neonatal deaths/weak calves

- PI calf & TI individuals: immunosuppression

- PI calf: noncytopathic  
biotype



cytopathic = Mucosal disease  
biotype

# BVDV in Australia

- 80-90% of herds exposed
- 30-40% of cattle exposed
- 0.5-1 % prevalence of PI animals (major source of virus)
- Vaccine (Pestigard®, Zoetis) available since 2003
- Prior to vaccine launch, some protection achieved by deliberate exposure of immunologically naive herd-mates to a PI animal

# Impact on growing cattle

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Period analysed	'Feb' to 'June'			'Feb' to 'Nov'		
	Weight Gain (kg) (Number of animals)		Difference (kg)	Weight Gain (kg) (Number of animals)		Difference (kg)
	Vaccinate	Control	V - C	Vaccinate	Control	V - C
Property 1	<b>5.9</b> (197)	<b>3.6</b> (194)	<b>2.3*</b>	<b>139.5</b> (197)	<b>138.2</b> (194)	<b>1.3</b>

\*p=0.067

# Impact on growing cattle

Period analysed	'Feb' to 'June'			'Feb' to 'Nov' <b>Property 1</b> 'March' to 'Sept' <b>Property 2</b>		
	Weight Gain (kg) (Number of animals)		Difference (kg)	Weight Gain (kg) (Number of animals)		Difference (kg)
	Vaccinate	Control	V - C	Vaccinate	Control	V - C
<b>Property 1</b>	<b>5.9</b> (197)	<b>3.6</b> (194)	<b>2.3*</b>	<b>139.5</b> (197)	<b>138.2</b> (194)	<b>1.3</b>
<b>Property 2</b>				<b>103.6</b> (58)	<b>99.2</b> (60)	<b>4.4</b>

\*p=0.067



**Table 2:** Numbers of animals categorised, on each property, at the commencement and end of the trial, by S/P ratio category.

## Numbers of animals categorised, on each property, at the commencement and end of the trial, by BVDV antibody level

Property 1			Control		Vaccinates	
S/P ratio	S/P category	Serological State	Initial	Final	Initial	Final
<0.3	Neg	Neg	58	2	58	14
0.3-0.69	Low	Pos	71	2	70	22
0.7-1.19	Mod	Pos	35	18	33	51
1.2-1.79	High	Pos	31	166	36	106
>1.8	Very High	Pos	1	8	2	6
<b>Total</b>			<b>196</b>		<b>199</b>	

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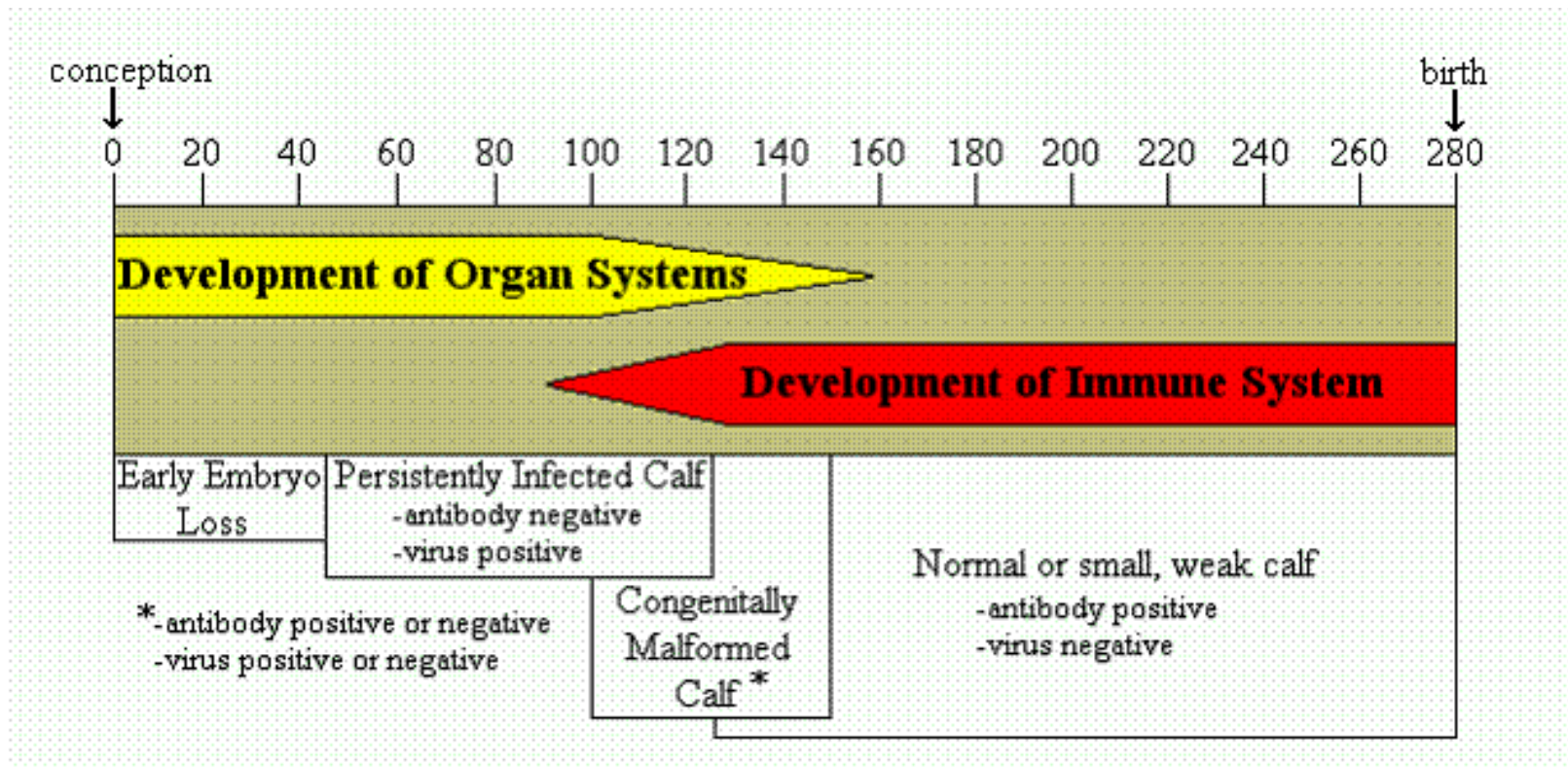
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<b>Total</b>			<b>196</b>		<b>199</b>	

Property 2			Control		Vaccinates	
<0.3	Neg	Neg	20	5	15	5
0.3-0.69	Low	Pos	3	0	7	1
0.7-1.19	Mod	Pos	7	15	11	14
1.2-1.79	High	Pos	28	40	23	38
>1.8	Very High	Pos	2	0	2	0
<b>Total</b>			<b>60</b>		<b>58</b>	

# Impact on breeding cattle

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<http://www.swansvet.com>

# Control of BVDV

BVDV control conducted by 35.3% of respondents (36/102)

Vaccination	Deliberate exposure
83.3%	16.6%

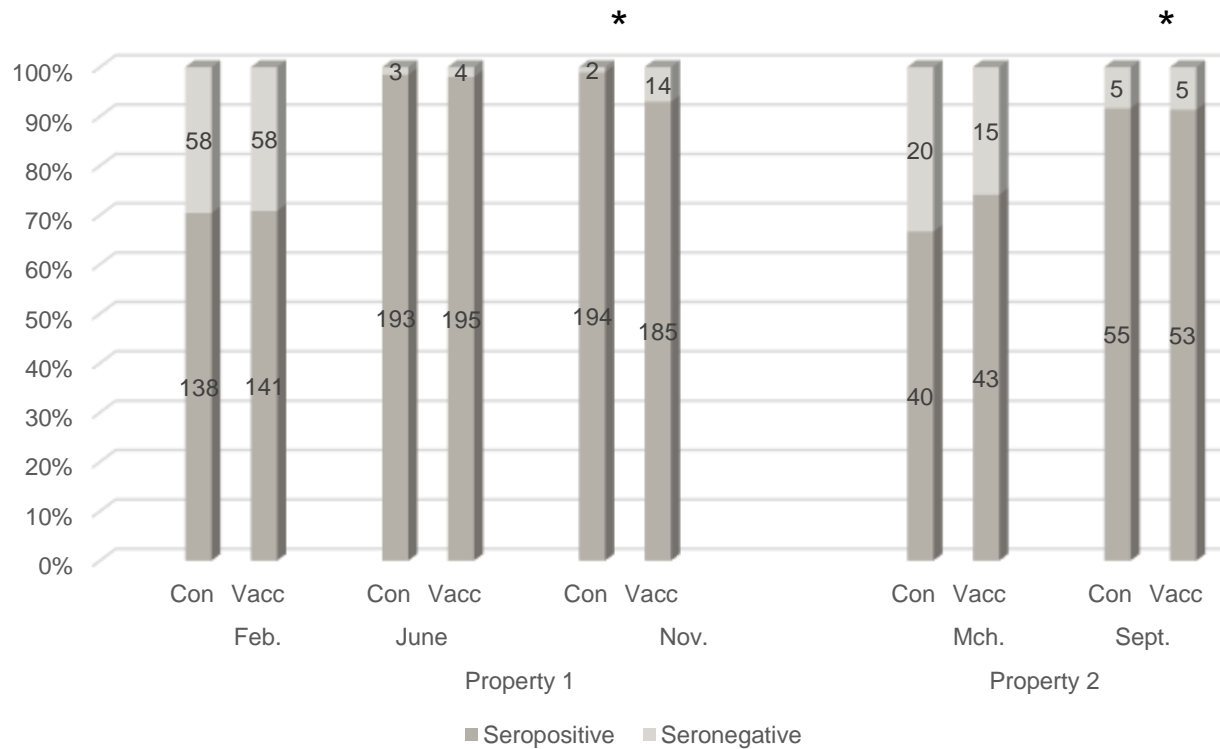
Smith, Hernandez-Jover & Exton, 2014

# Audience participation

# Implications

- Individually vaccine not 100%, *BUT* effective for herd immunity!
- To achieve optimal control one cannot rely on immunity alone
- $R = \beta \kappa D$   
(Repro. Rate (R) = prob. transm. ( $\beta$ ) x freq. of contact ( $\kappa$ ) x duration of infectious period (D))
- ‘Gold-standard’ control requires three-prong approach  
(PI removal, Immunity (Biocontainment) & Bioexclusion)

## Serological change on both properties, by treatment group, at the respective blood-sampling points



\*  $P < 0.01$  (the comparison of numbers of seronegative animals in treatment groups, at final sampling date, between both properties)



# Take-home messages– ‘optimal’ control

- **Initial screening-test** (to establish current situation)
- **Remove the main source of infection** (identify and remove known PI's)
- **Protect susceptible animals in the herd** (vaccinate, to complete vaccine programme **2-4 weeks before** joining)
- **Prevent reintroduction of disease** (test, quarantine & vaccinate added animals, maintain fences, prevent nose-to-nose contact (3m))
- **Bulls** (purchase BVDV-tested (antigen negative) bulls)

# Acknowledgements

Thank you to:

- The property owners for access to the animals, and their assistance
- Zoetis Australia for the supply of Pestigard® and their financial support
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(especially Jess Turner for logistics support)
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