



Massey University

Economic effects of BVDV in NZ dairy herds

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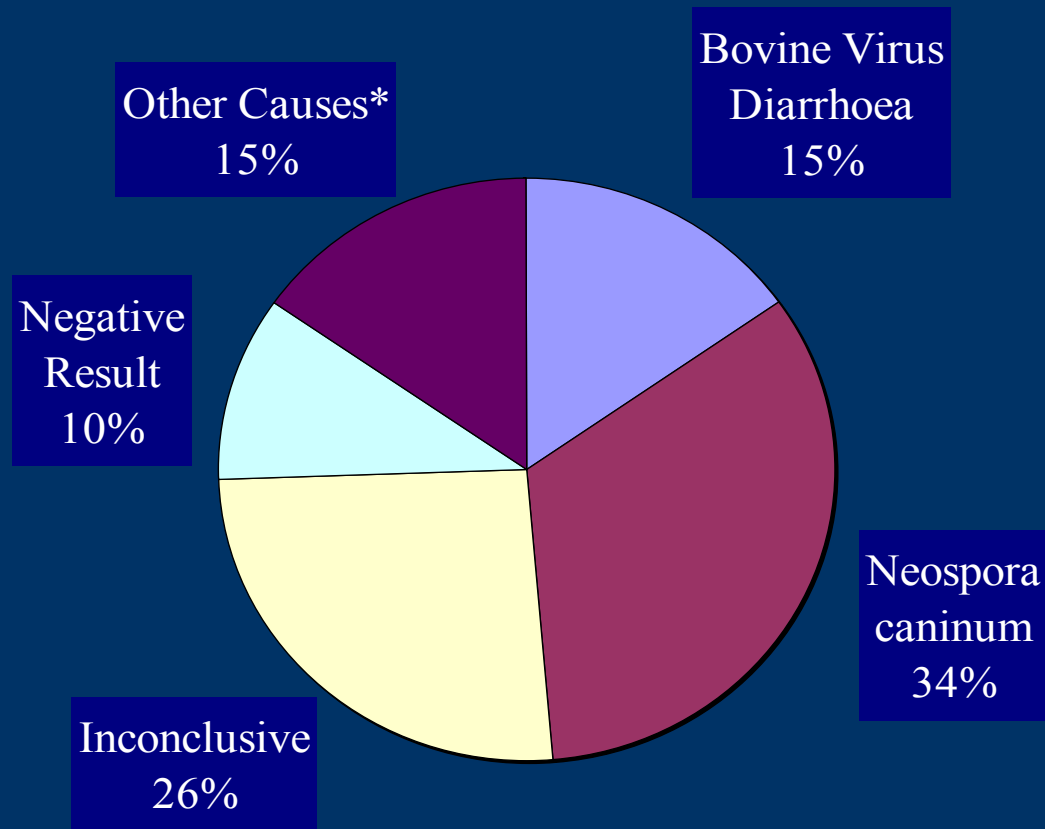
Contents

- BVDV in NZ
- Herd level infection status
- Determining herd infection status
- Economic effects of infection with BVDV
- Estimated annual loss

BVDV in New Zealand

- Infection believed to be widespread in NZ
- Serological evidence 1966 (Fastier and Hansen)
- First BVDV isolation in 1967 (Jolly et al.)
- Surveys in dairy and beef herds 1977, 1990, 1995:
34-60% prevalence

Causes of Abortion in NZ Dairy Herds



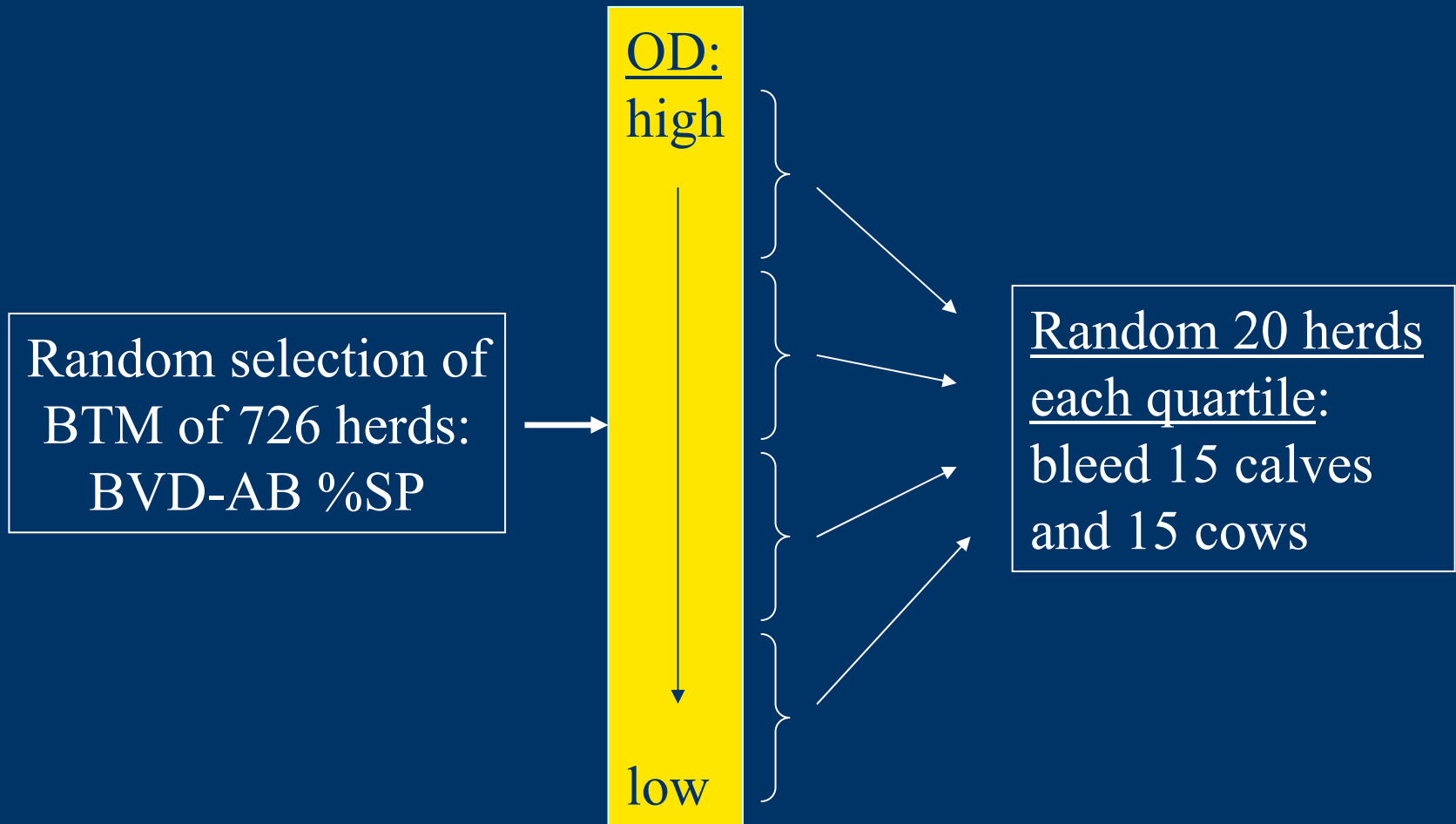
Thobokhwe et al. 2004 NZVJ 52(2):90

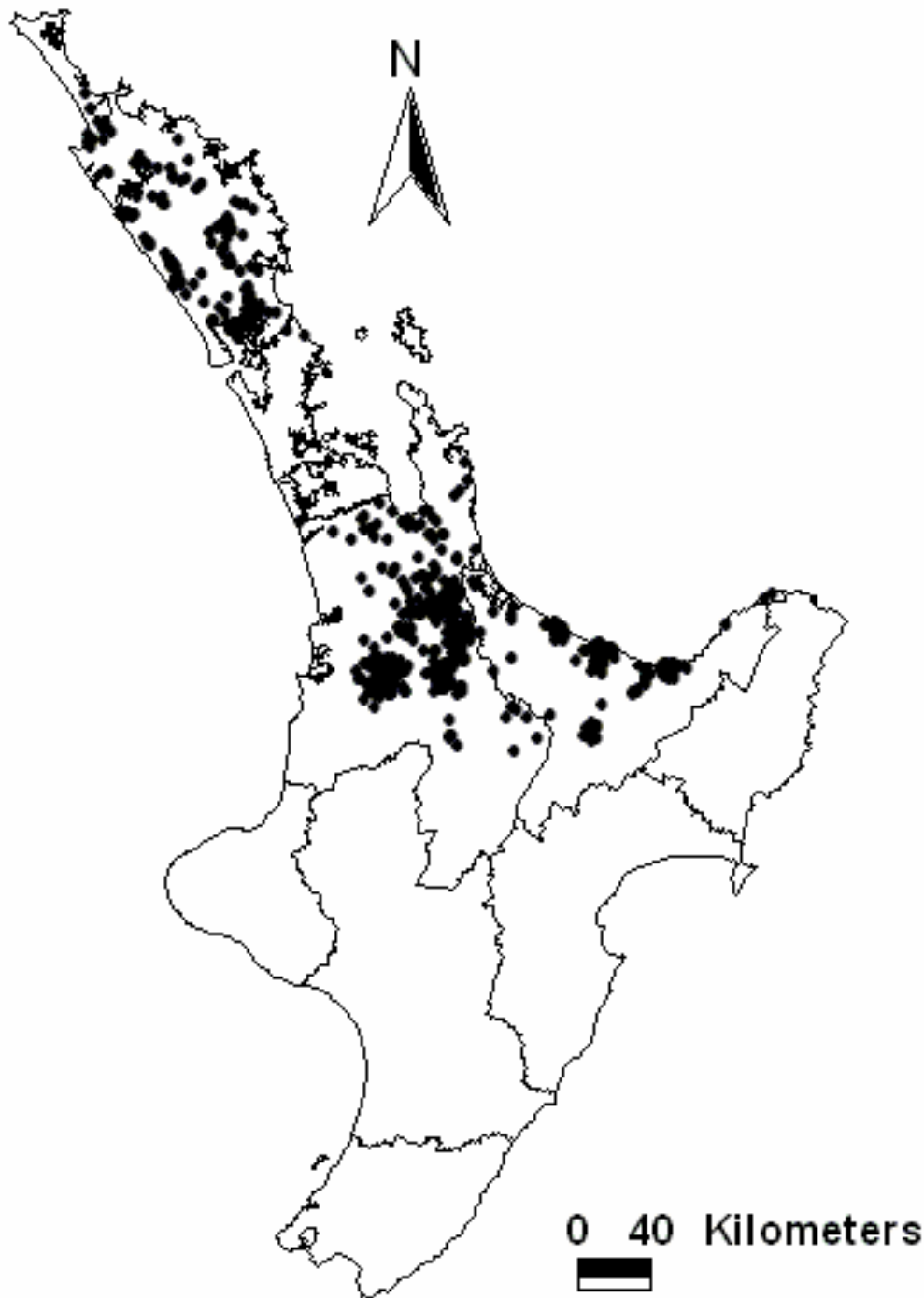
Objectives

1. Evaluate BTM antibody ELISA as a predictor for the presence of PI animals in the herd
2. Translate these parameters to estimates of loss

1. Evaluate BTM ab-ELISA

2001/02 season, sampling in March 2002



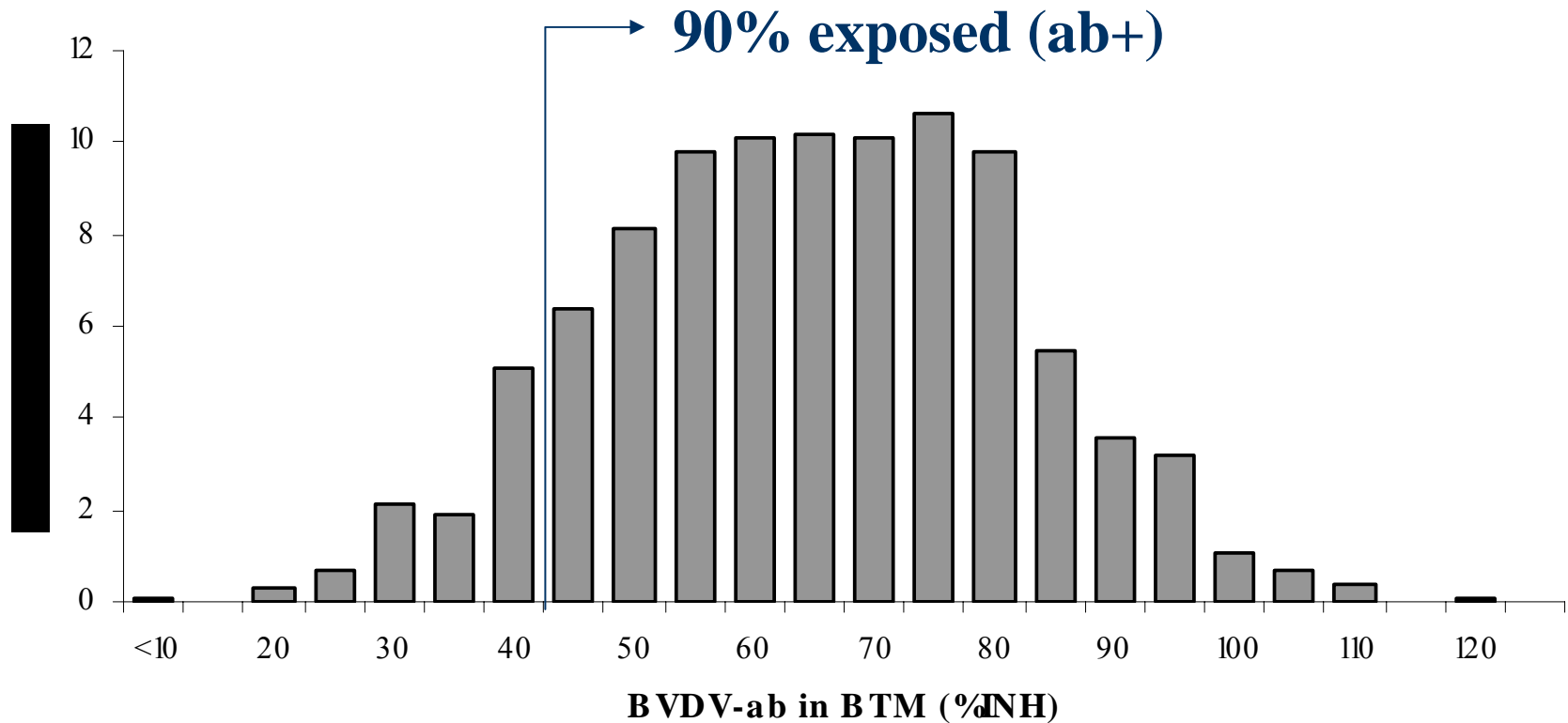


Origin of herds
n = 724
sampled March 2002

Thobokhwe et al. 2004
NZVJ, 52(6):394-400

Distribution of BTM %INH ELISA

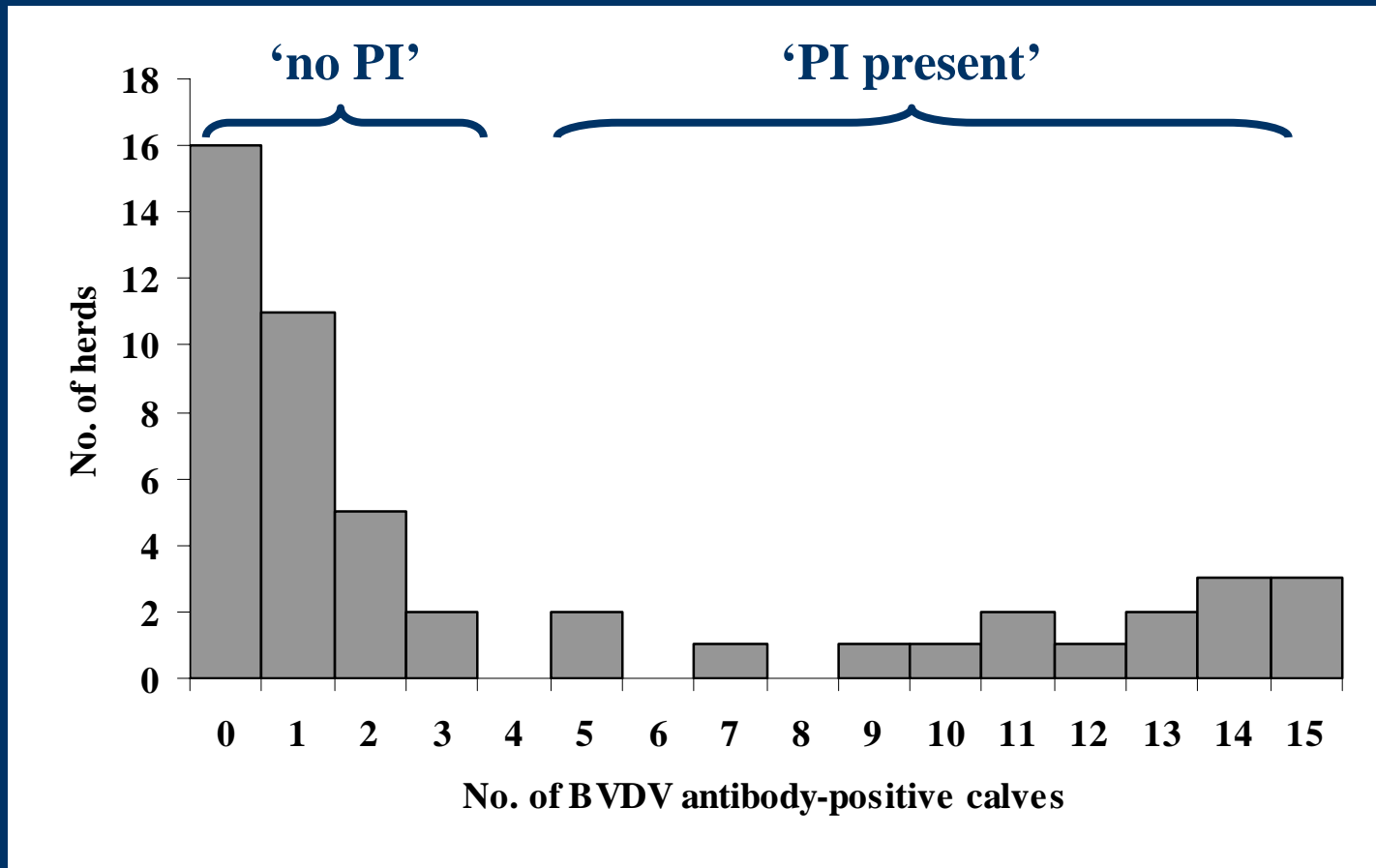
724 herds



Thobokhwe et al. 2004 NZVJ, 52(6):394-400

15 calves/herd (age 6-18 month)

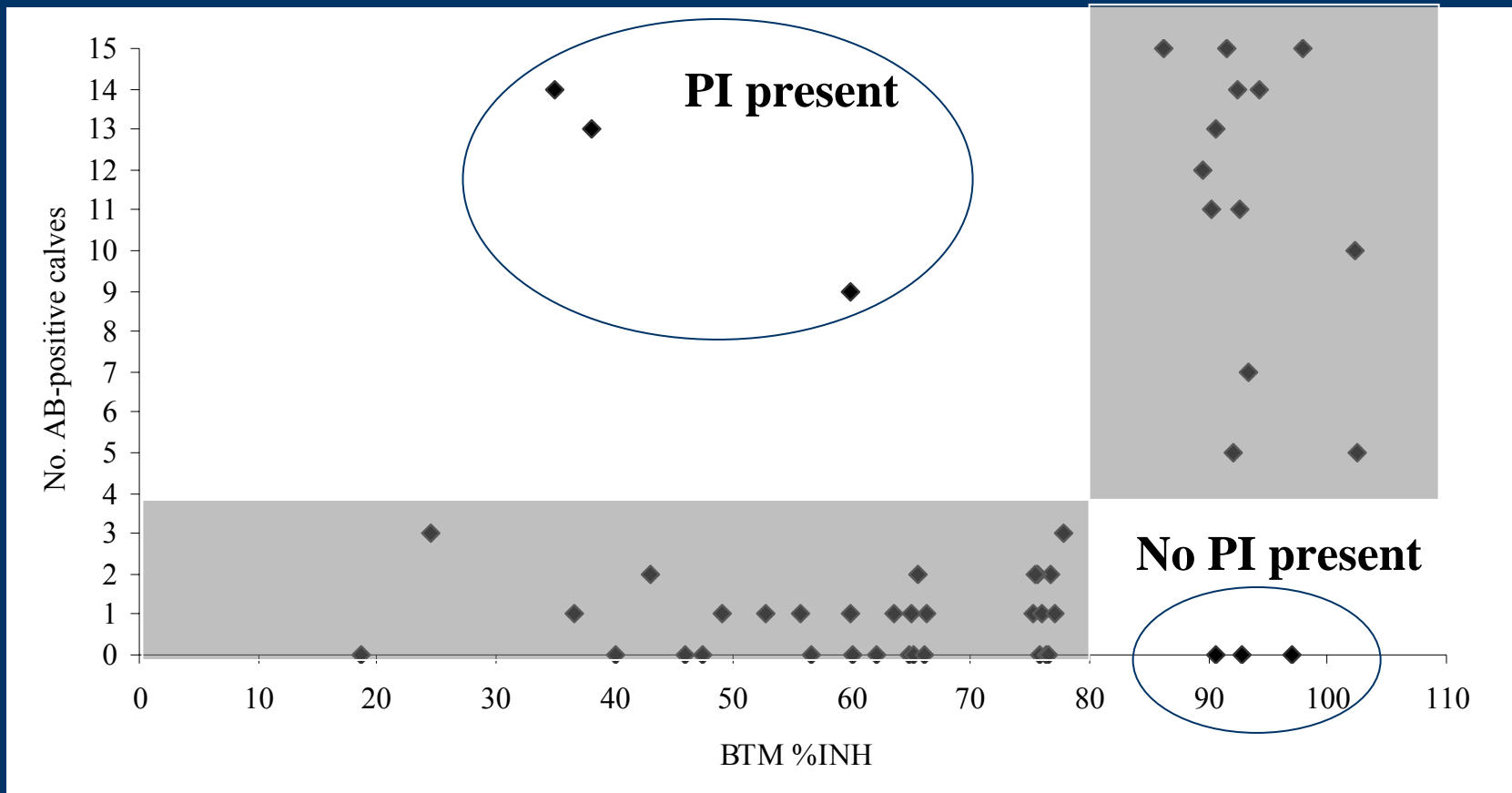
50 herds



Thobokhwe et al. 2004 NZVJ, 52(6):394-400

BTM antibody Test Evaluation

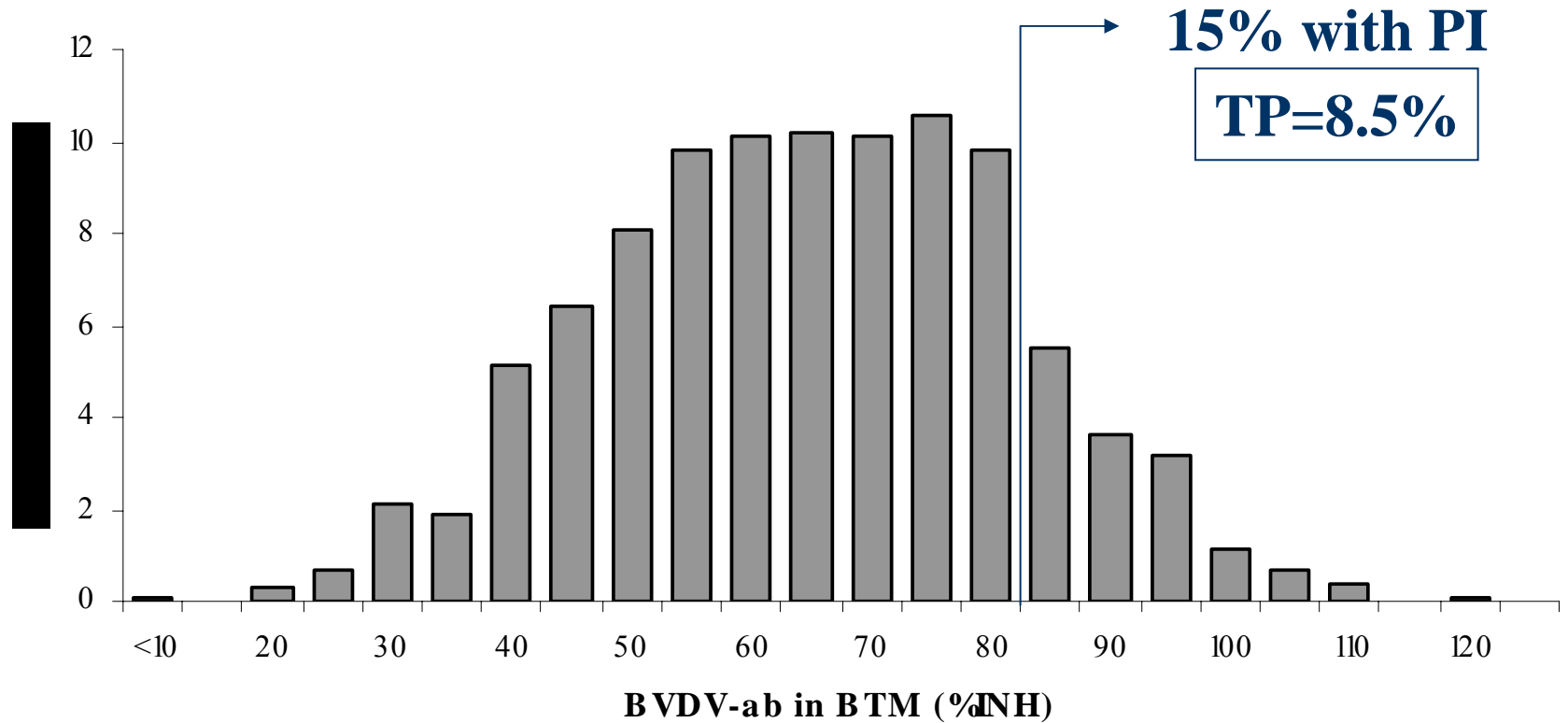
At 80%INH threshold: 81% sensitivity, 91% specificity



Thobokhwe et al. 2004 NZVJ, 52(6):394-400

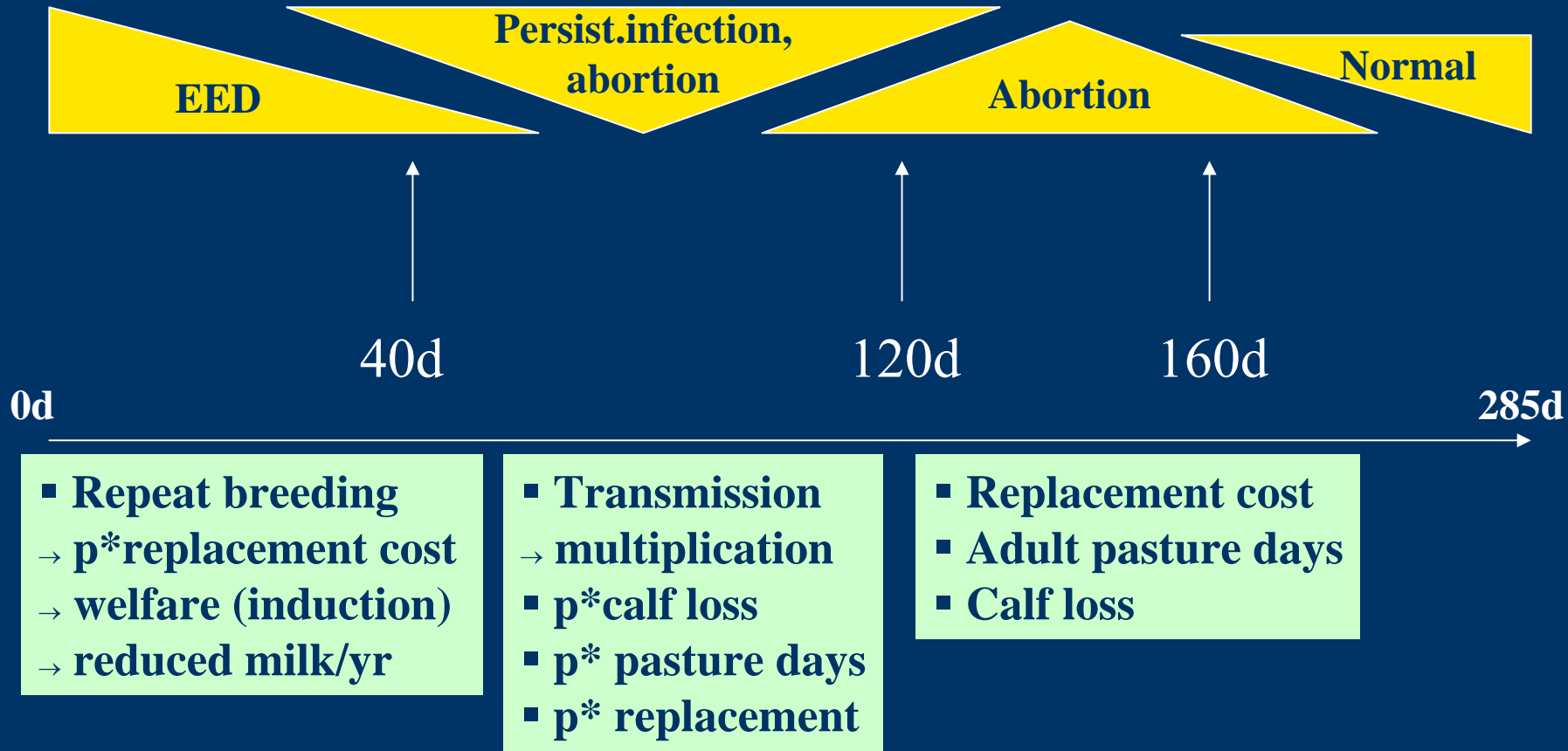
Distribution of BTM %SP ELISA

724 herds: PPV=46%, NPV=98%



Thobokhwe et al. 2004 NZVJ, 52(6):394-400

Economic Effects vs . Time of Infection



Effects of BVDV on Production

- Reviewed studies:
 - Cow level: 1993, 1994, 2001
 - Herd level: 1995, 1998, 2001, 2004
- Most studies found increased abortion rates
- Cow level: reduced conception rates (Houe et al, 1993; Larsson et al., 1994)
- No effect on 3-wk return rates, but increased risk of late returns (Robert et al., 2004)
- Milk reduction due to immuno-suppression (mastitis \uparrow : Cai et al., 1994) and energy required for sero-conversion (Moerman et al., 1994)

Estimation of Economic Loss

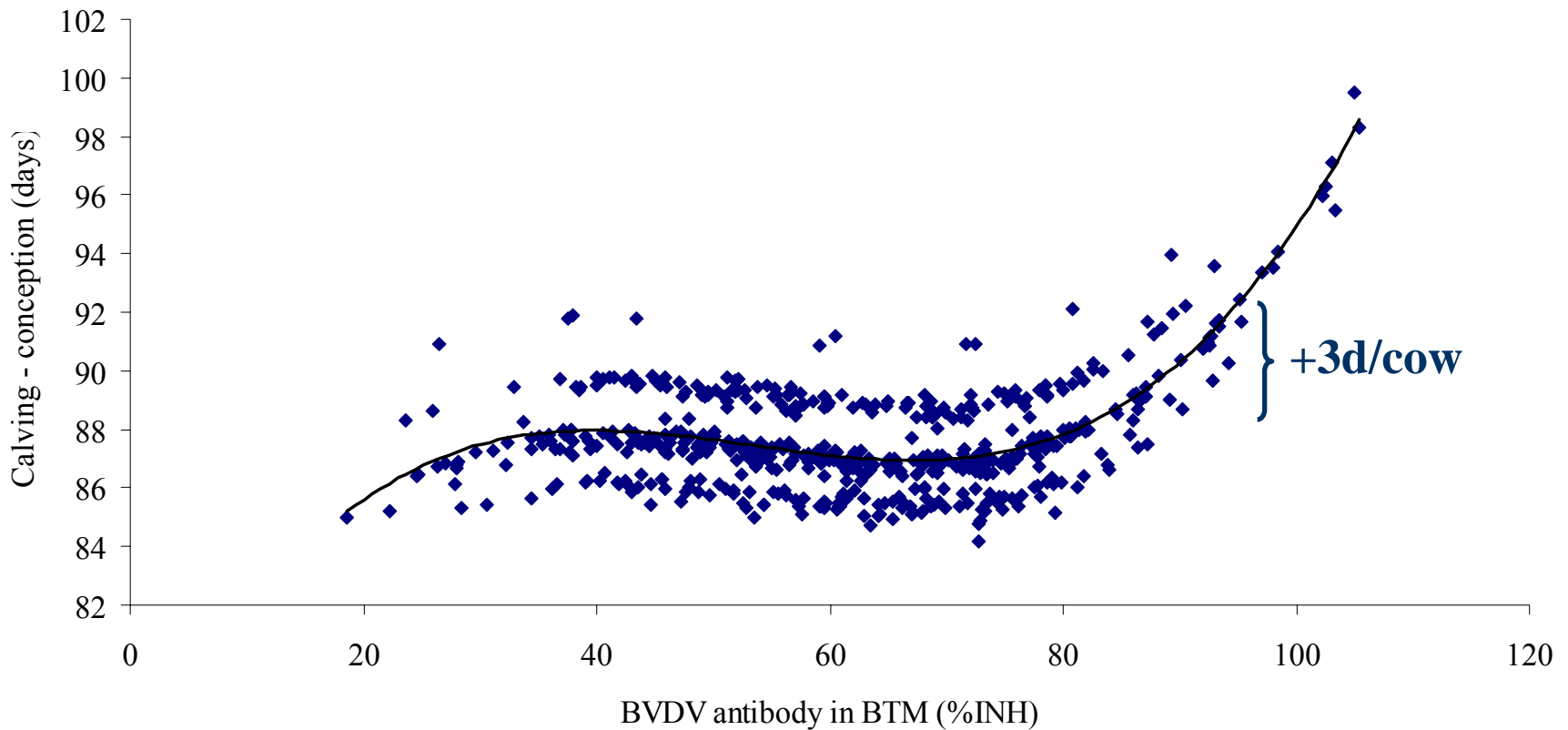
- LIC data from 602 herds
 - 153,000 lactations
 - 499,000 milk tests
 - 150,000 gestation periods
 - 221,000 matings
- Calvings: June 2001- May 2002
 - To relate to BTM sample of March 2002

Estimation of Economic Loss

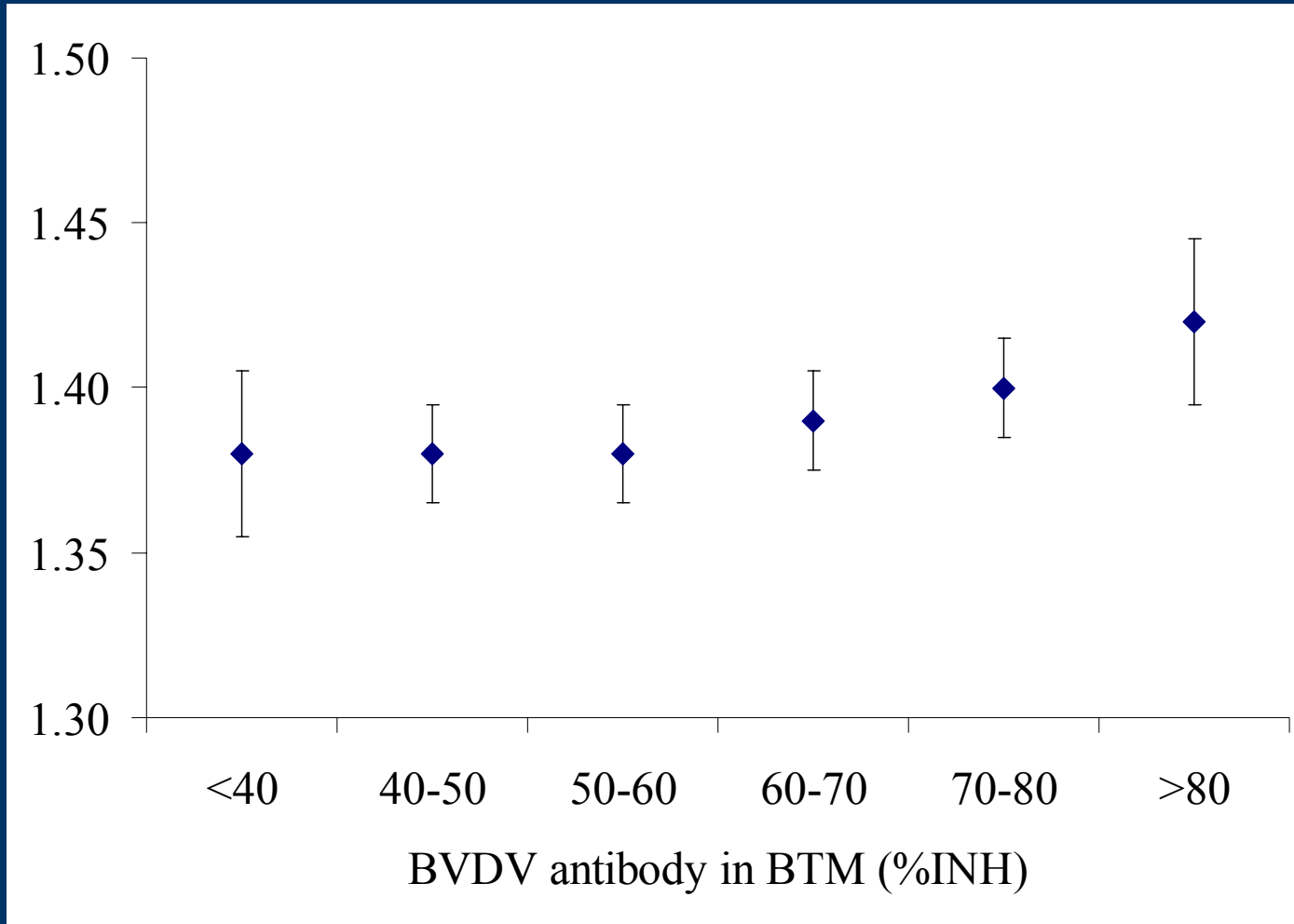
- Reproductive indices:
 - Abortion rate
 - Proportion physiological service intervals
 - 1st service conception rates
 - Interval calving to conception
 - Services per conception
 - Pregnancy rate
 - Induction rate
- Production parameters:
 - Solid adjusted milk production (age, DIM)
 - Culling rate: overall and due to reproductive failure
 - Bulk tank somatic cell count

- Observed performance parameters adjusted for region (Northland, BoP, Waikato), herds size, and breed composition
- No effect observed:
 - 1st service conception rate
 - Percent normal service intervals
 - Pregnancy rate
 - Culling rate
 - Culling due to non-conception
 - Bulk tank milk somatic cell count

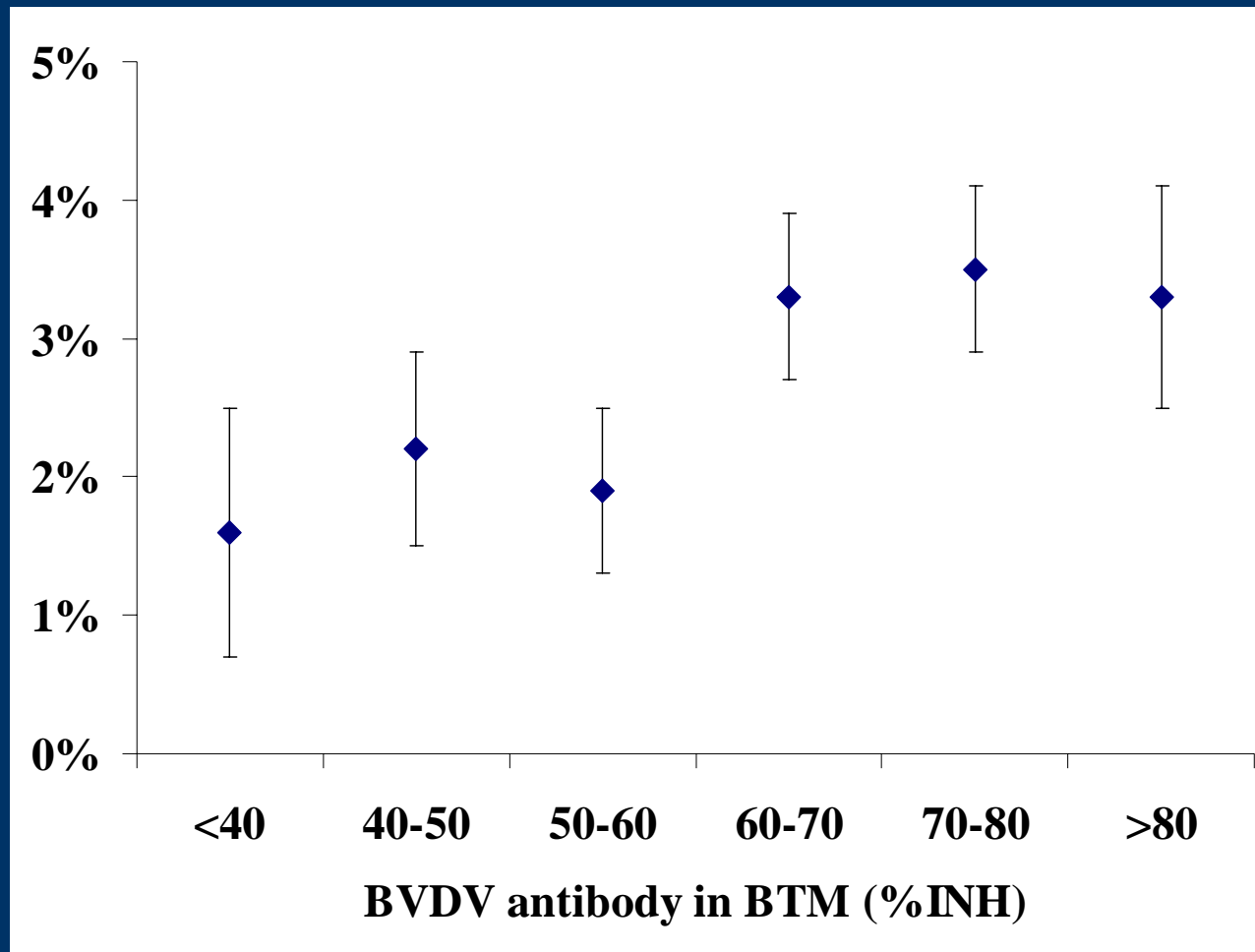
Calving – Conception Interval



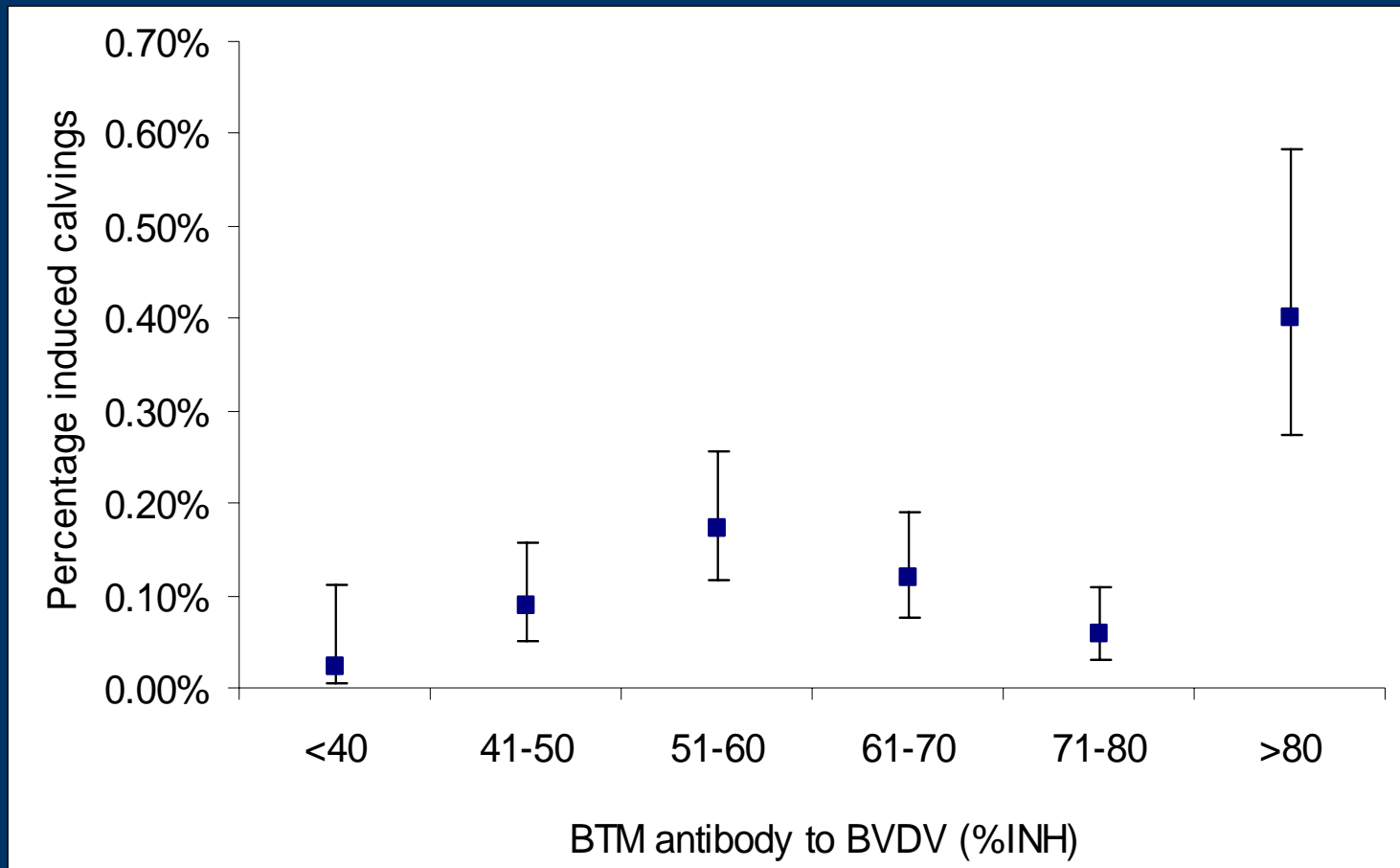
Services per conception: +0.02



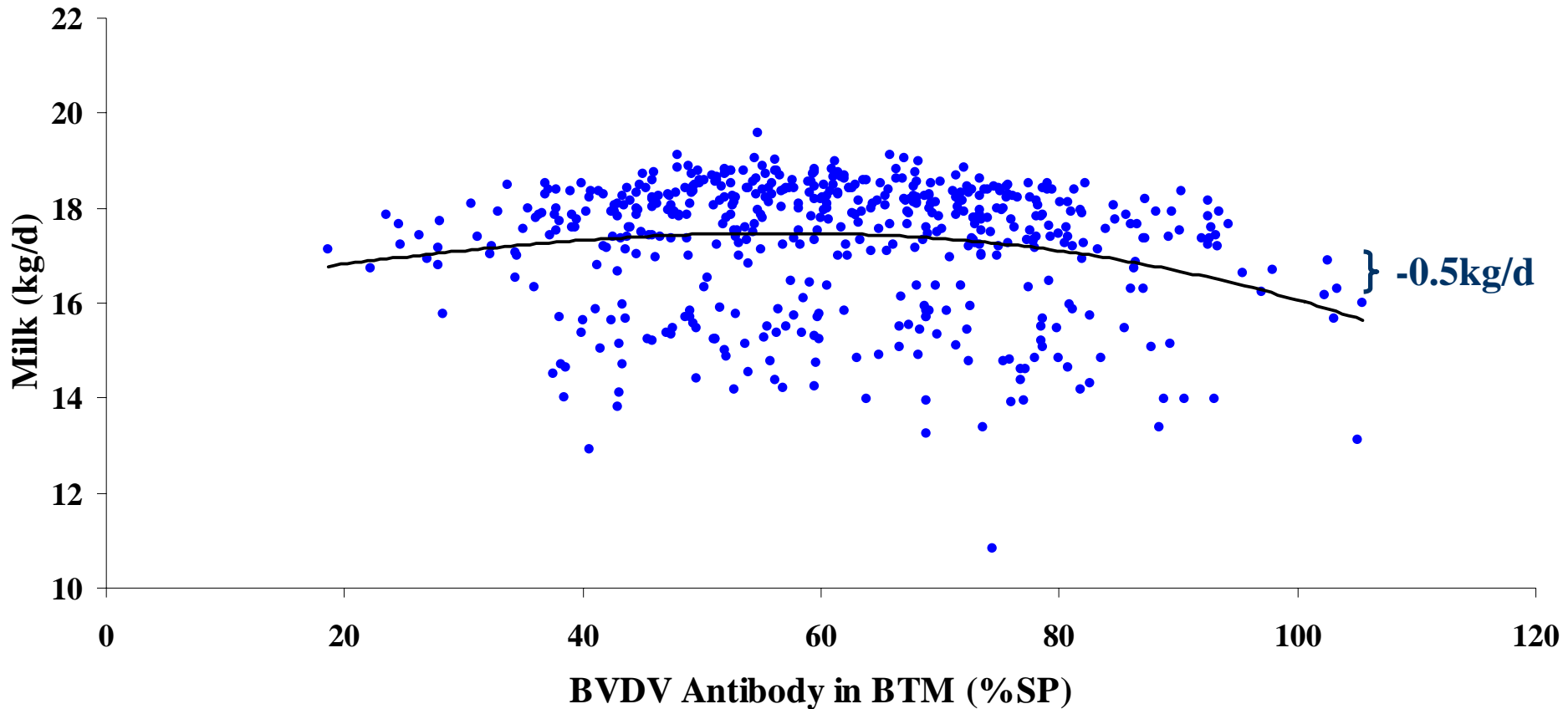
Rate of abortion: +1.5%



Induction rates: 4-fold increase



Solid Adjusted Milk Production (kg/d)



Economic Loss

- Affected herd (300 cows):
 - +3d/cow to conception x 300cows x 1.2kg solids/d x \$4 = \$4,320
 - -0.04kg solids x 250d x 300cows x \$4 = \$12,000
 - +1.5% abortion x 300cows x \$800 RPO = \$3,600
 - calf loss: \$100 x 4% * 300 cows = \$1,200
 - **Total loss \$21,120 per year**
= \$70 per cow+year
- All herds in NZ
 - 15% infected: $.15 * \$70 * 3.5\text{mill. cows} = \mathbf{\$37\text{mill}}$

Conclusions

- BVDV fairly widespread in NZ
- 8.5% herds with PI animals
- BTM antibody test has reasonable accuracy of detecting such herds
- BVDV affected abortion rate, time to conception, SPC, induction rate, and milk production
- Crude loss estimate around \$70 per cow-year
- Approx. \$37mill. lost each year