

# Understanding the relationship between animal behaviour and morbidity in feedlot calves - Implications for Industry

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Olds, AB**



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Agri-Food Canada**

**Agriculture et  
Agroalimentaire Canada**

**Canada** 

# *Economics of disease*

- Economic loss associated with BRD large
- BRD accounts for:
  - 65-77% morbidity
  - 44-72% mortality

(*Quimby et al., 2001; USDA 1994*)
- Cost of treatment
- Labour and lost production  
(*Galyean et al. 1999*)



# Detection of sick

- Lung lesion data (Wittum et al., 1996)
  - 68% never treated for BRD
  - Visual appraisal not always effective
  - Mass medication
- Behaviour patterns and physiology
  - predict onset before clinical signs
- Early intervention (early detection) more effective



# *Antibiotics*

- Reduction of antibiotic use
  - Drug cost
  - Public concern for antibiotic resistance
  - Trade issue?
- Targeted discriminatory use of antibiotics





# Objectives

- Use feeding behaviour to:
  - 1) Detect morbidity earlier than conventional methods
  - 2) Efficacy of new drugs
  - 3) Timing of treatment
  - 4) Drug combinations
  - 5) Pre-shipping management



# Research

- Large data sets
- Weather, feed, history, breed



# Effect of Pasturella Vaccine on Feeding Behaviour of healthy and morbid cattle

- How did feeding behaviour differ between sick and healthy cattle?
- Did cattle with or without lung lesions have different feeding durations and visits overall?
- Did outcome groups based on bunk attendance have different levels of a) BRD b) presence of lung lesions?



- Did sick calves administered the Pasturella vaccine have different feeding behaviour than sick calves not give the vaccination?





# Study Design

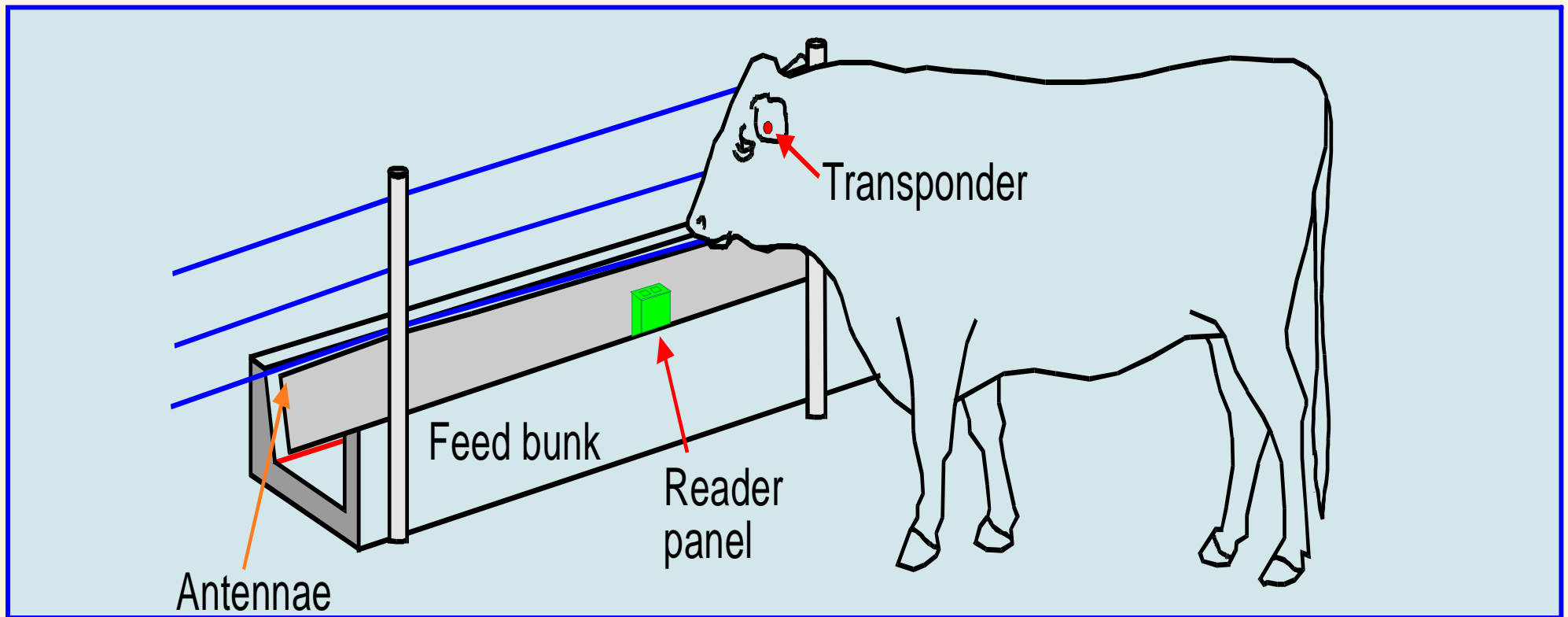
- 1857 auction market heifers (572 +/-32 lb)
- Processed, mass medicated on arrival; non-preconditioned
- 20 pen 91-97/hd/pen
- Pasturella Vaccine/ No vaccine
- Corn/corn silage
- 215 days on feed
  - 4 GrowSafe pens
  - 380 95/pen



# Variable Measured

- Performance
- Feeding Behaviour
- Lung Lesions
- BRD severity score
- Carcass









# View Raw Data

File Edit Operate Windows Help

Write to  
Spreadsheet



From

Year	1997
Month	5
Day	4
Hour	0

To

Year	1997
Month	5
Day	5
Hour	0

File Name 6583

Ver. 3.58 Dec, '97

Return

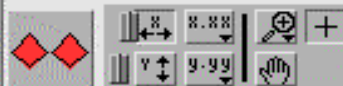
Other File

<<Prev. File

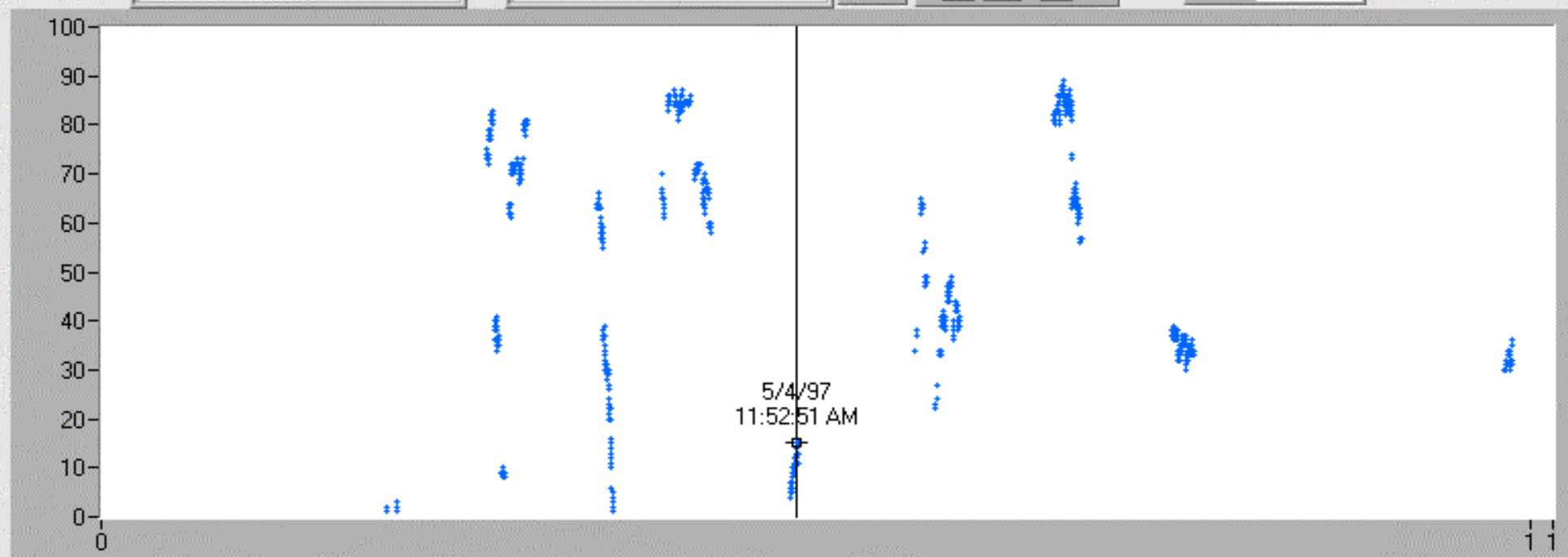
Next File >>

Move

Location



Data



Calc.  
Stats

Frequency Duration

13	142
13	142

Total for period viewed

Average Daily

Time (day's)

Processing



5/4/97

0.50

15.00



Directory Path

Path To Move To

d:\behaviordata\southwest\Feb1  
97 to Oct 24 97

c:\growsafe\data2

# Growsafe Data

- Bunk attendance duration (min/d)
- Bunk attendance frequency (visits)
- Inter-meal interval (min/d)
  - Average, total, min, max, standard deviation

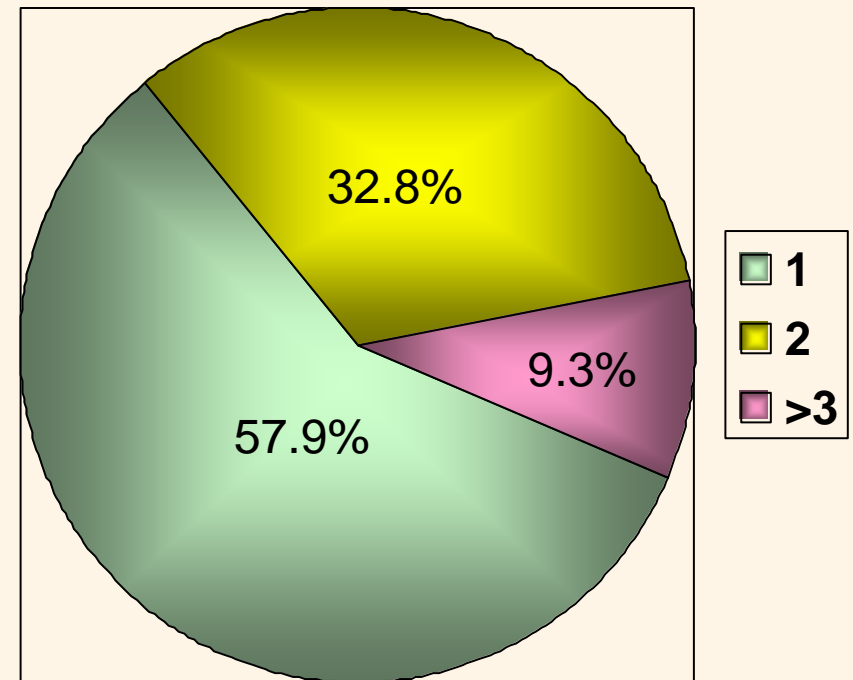
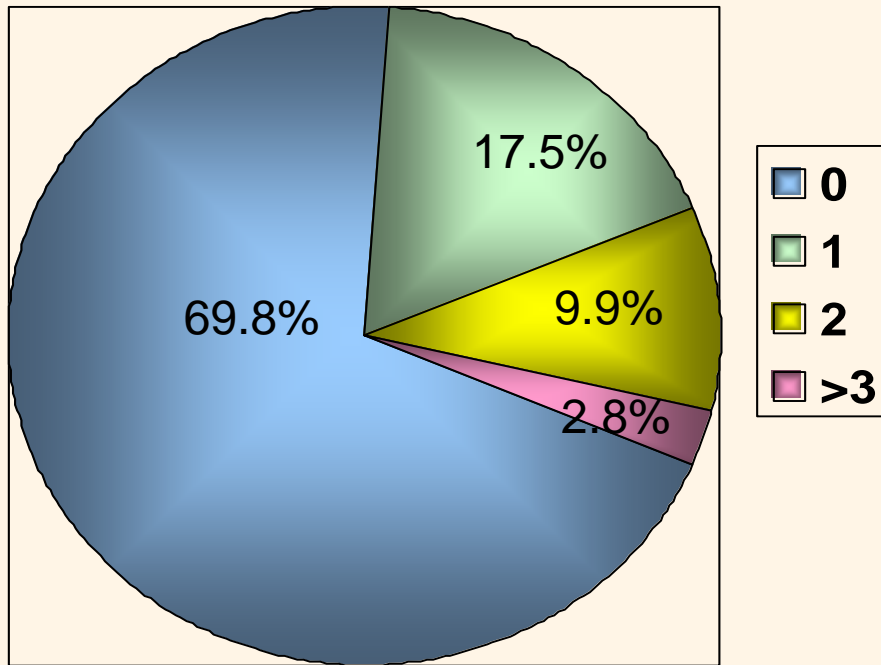


## Methods

- 176 total pulls (174 BRD diagnosis)
- Sick and healthy matched 1:1 by pen and day
- Data analyzed for entire trial and 4 d prior to being pulled
- BRD severity based on # of treatments
- Lung lesion data Y/N

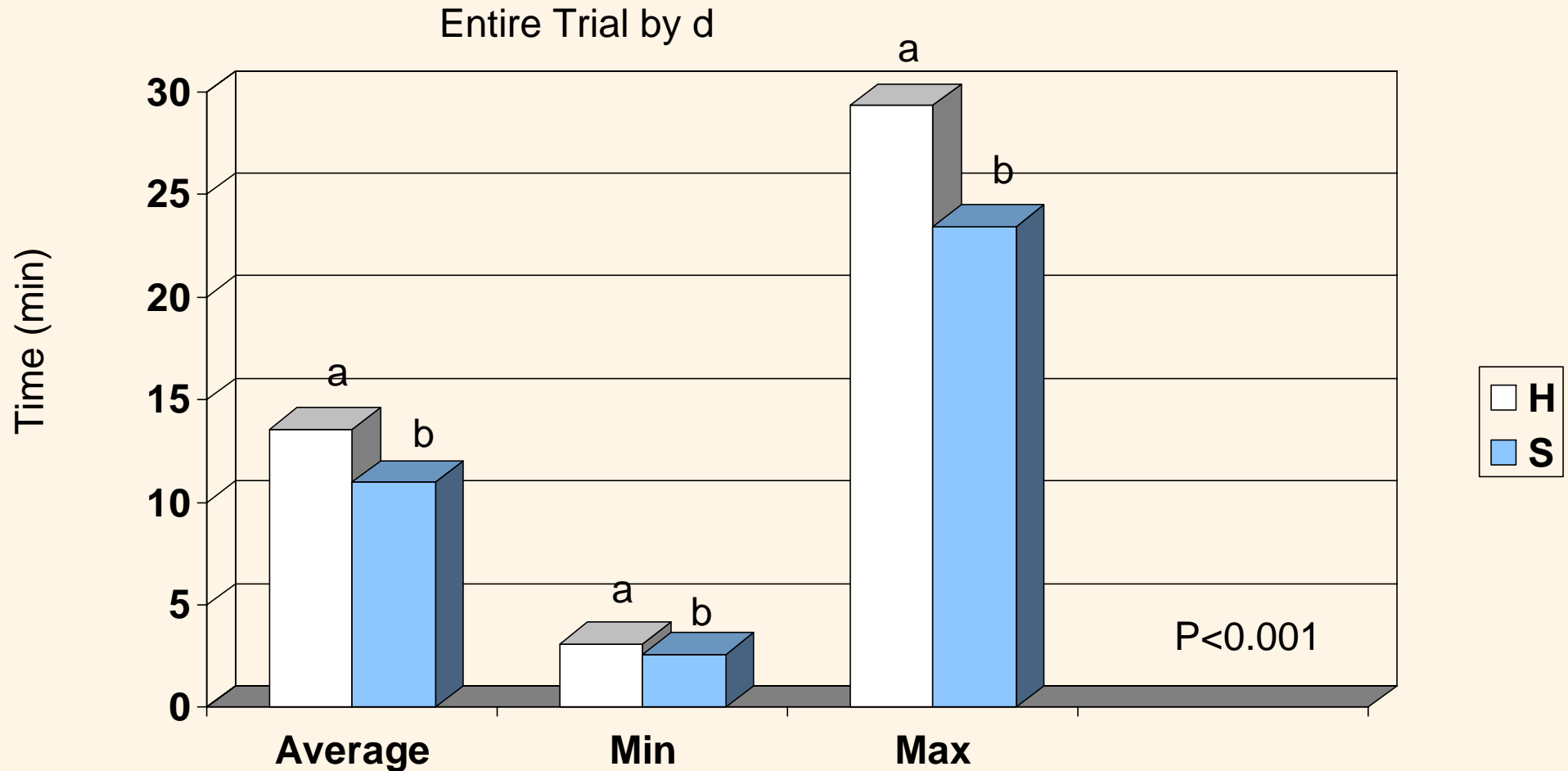


# 176 Total Pulls=116 Heifers

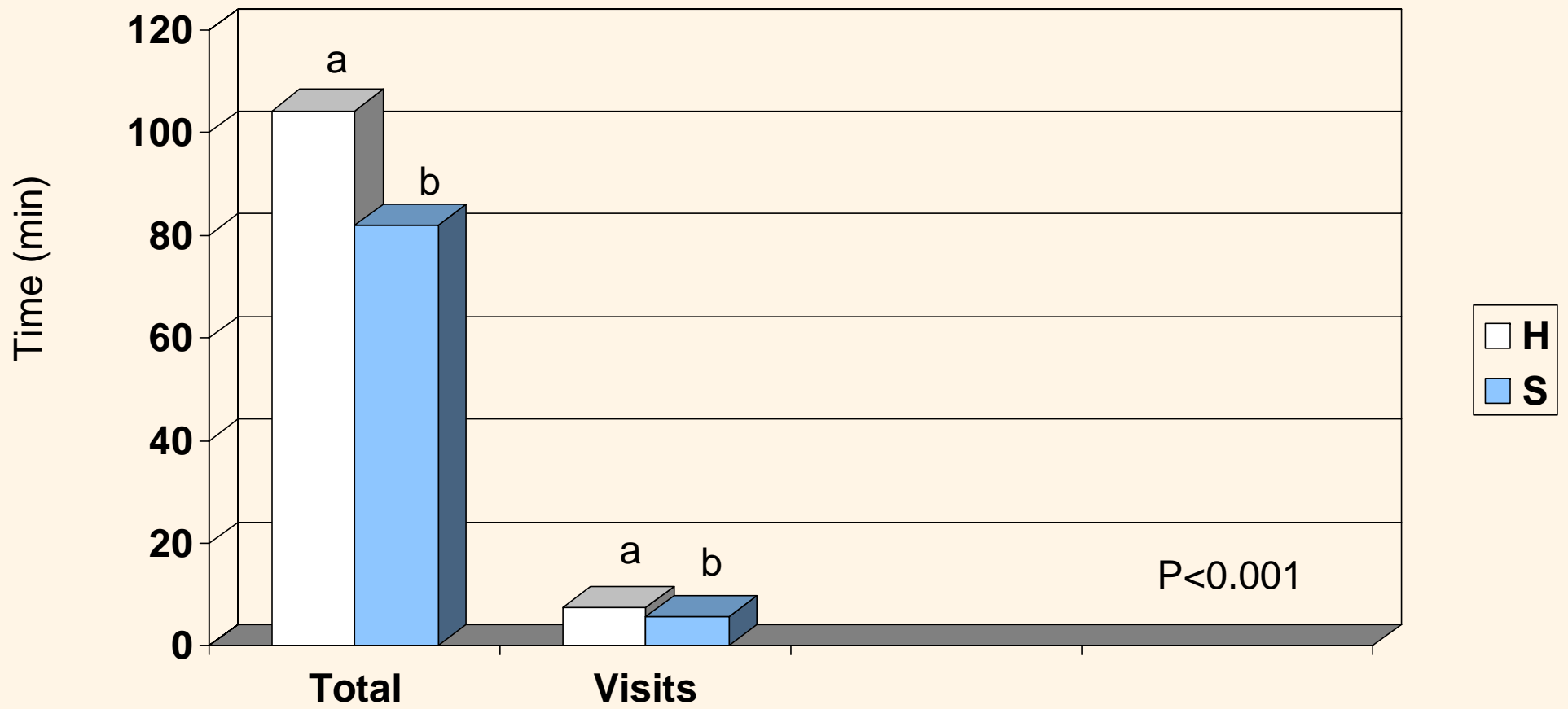




# Did bunk attendance duration differ between sick and healthy cattle?



Entire Trial by d

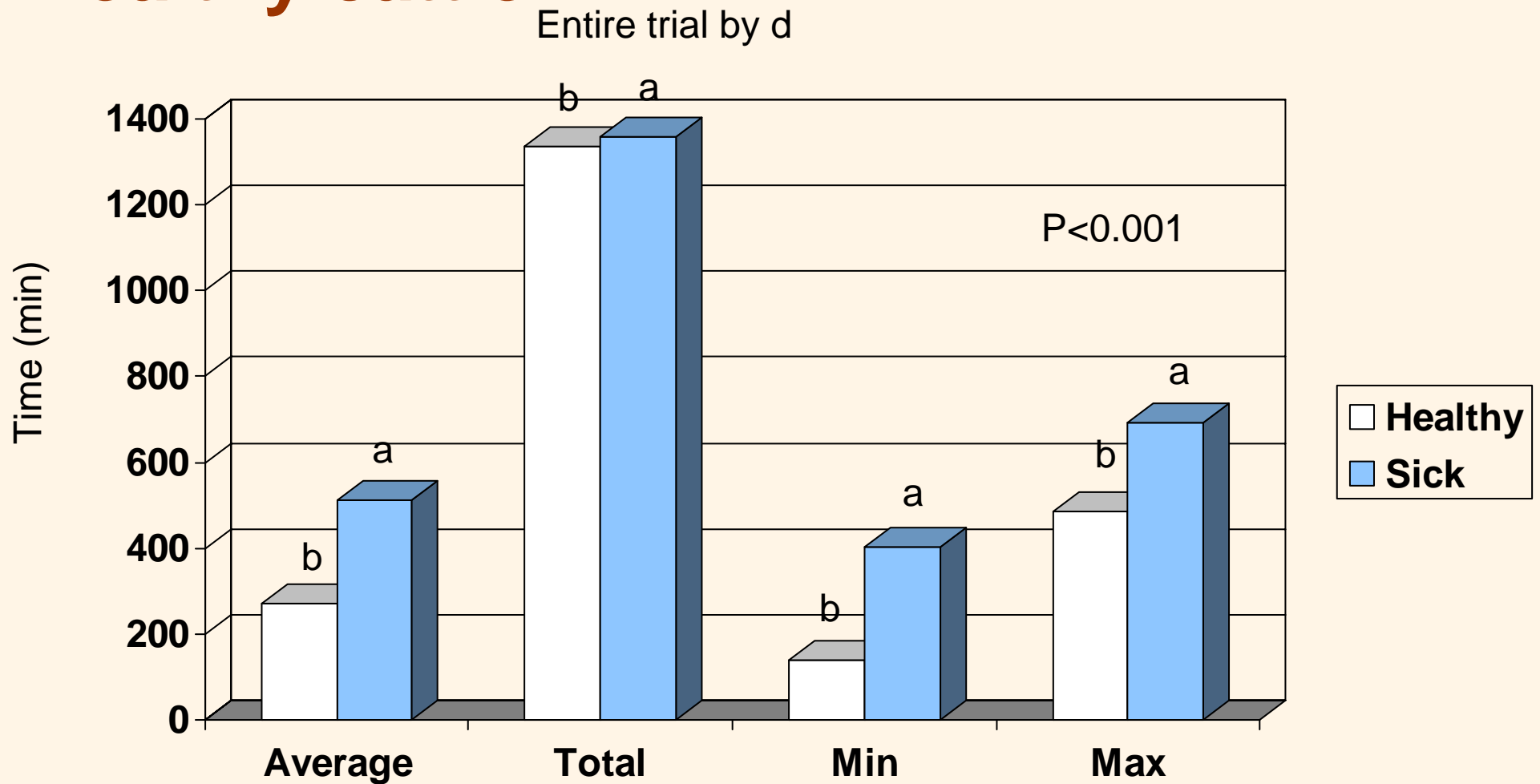


## *Other Studies*

- Healthy steers spend 30% more time at the feed bunk than morbid steers (*Sowell et al., 1998*)
- Morbid steers spent 23.7% less time at water than healthy (*Basarab et al., 1996*)



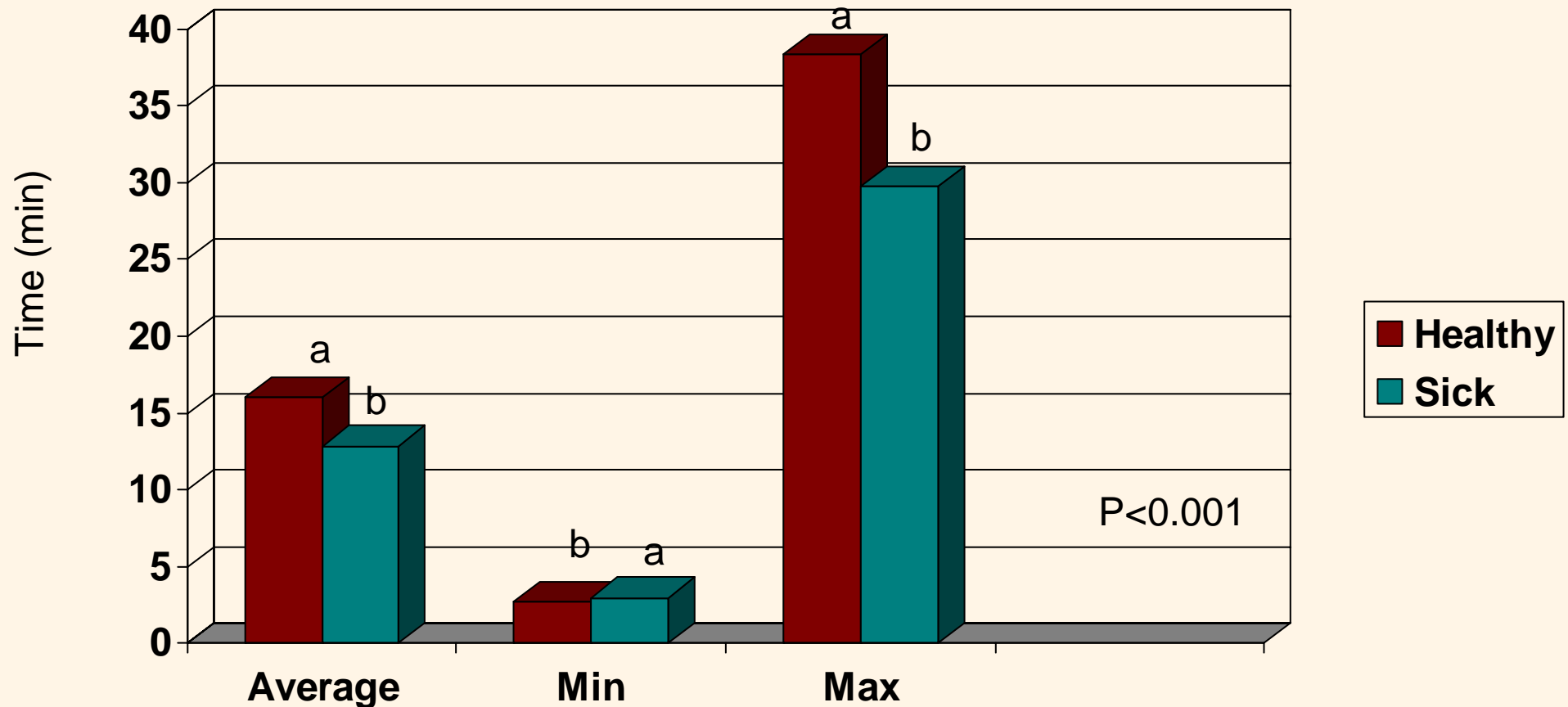
# Did time between bunk visits (inter-meal interval) differ between sick and healthy cattle?



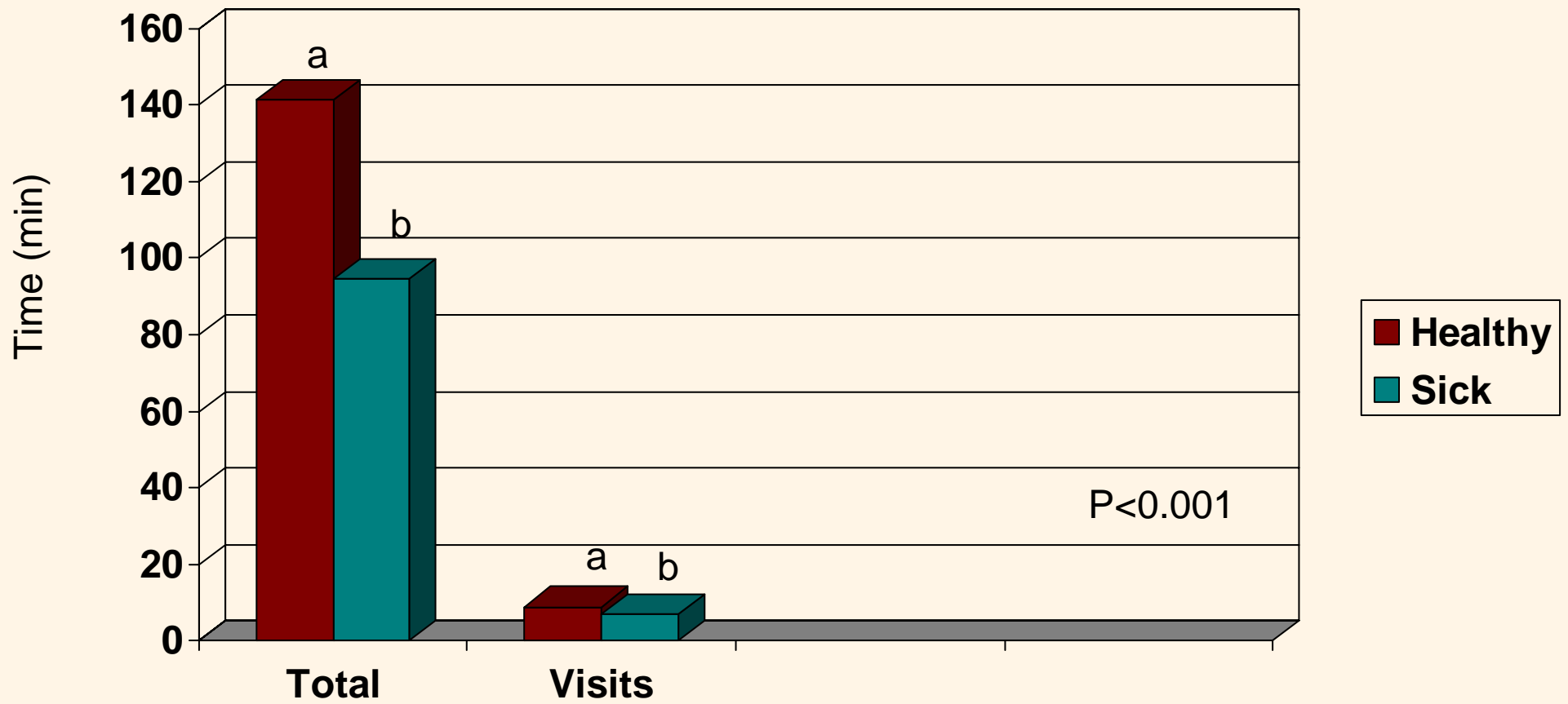


# Did bunk attendance duration differ between sick and healthy cattle?

Up to 4 d prior to being pulled by d

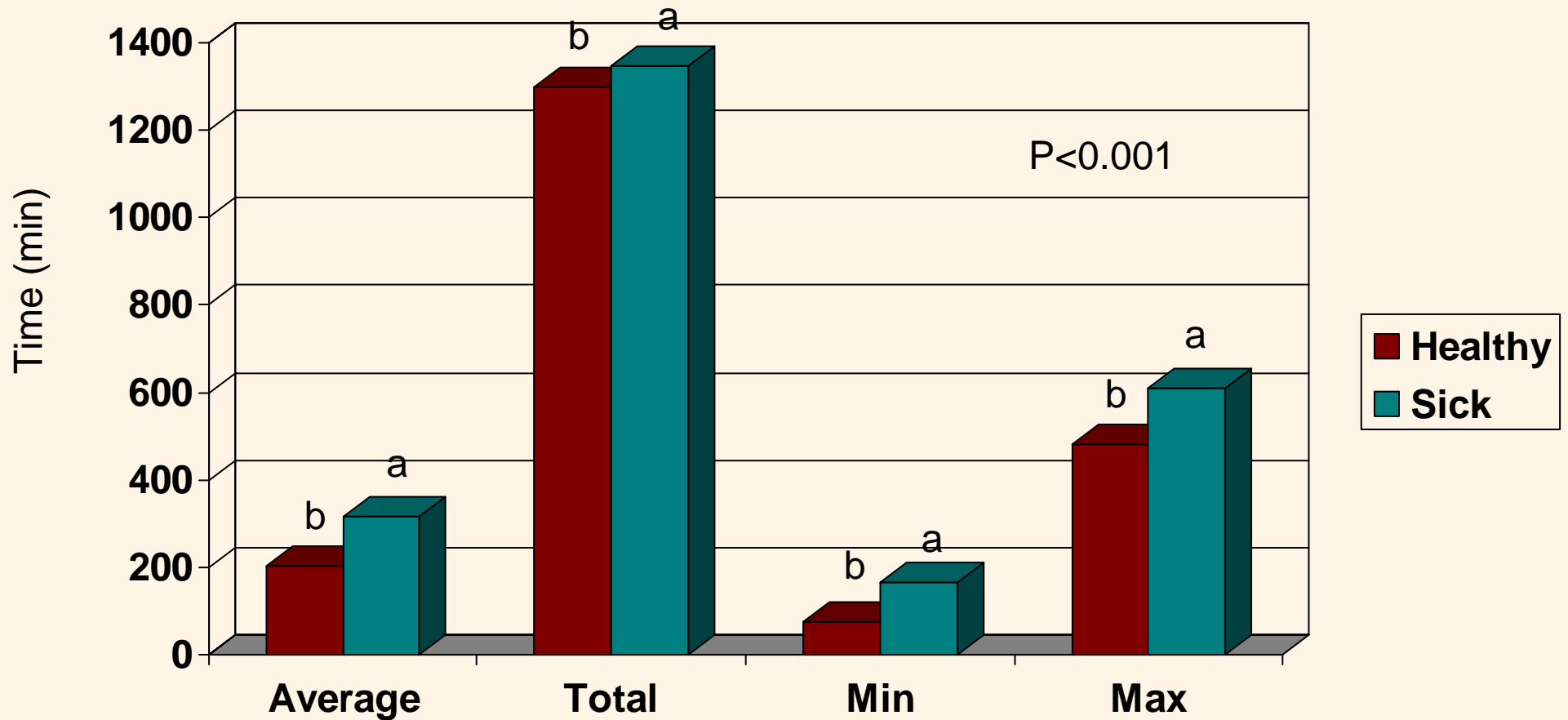


Up to 4 d prior to being pulled by d



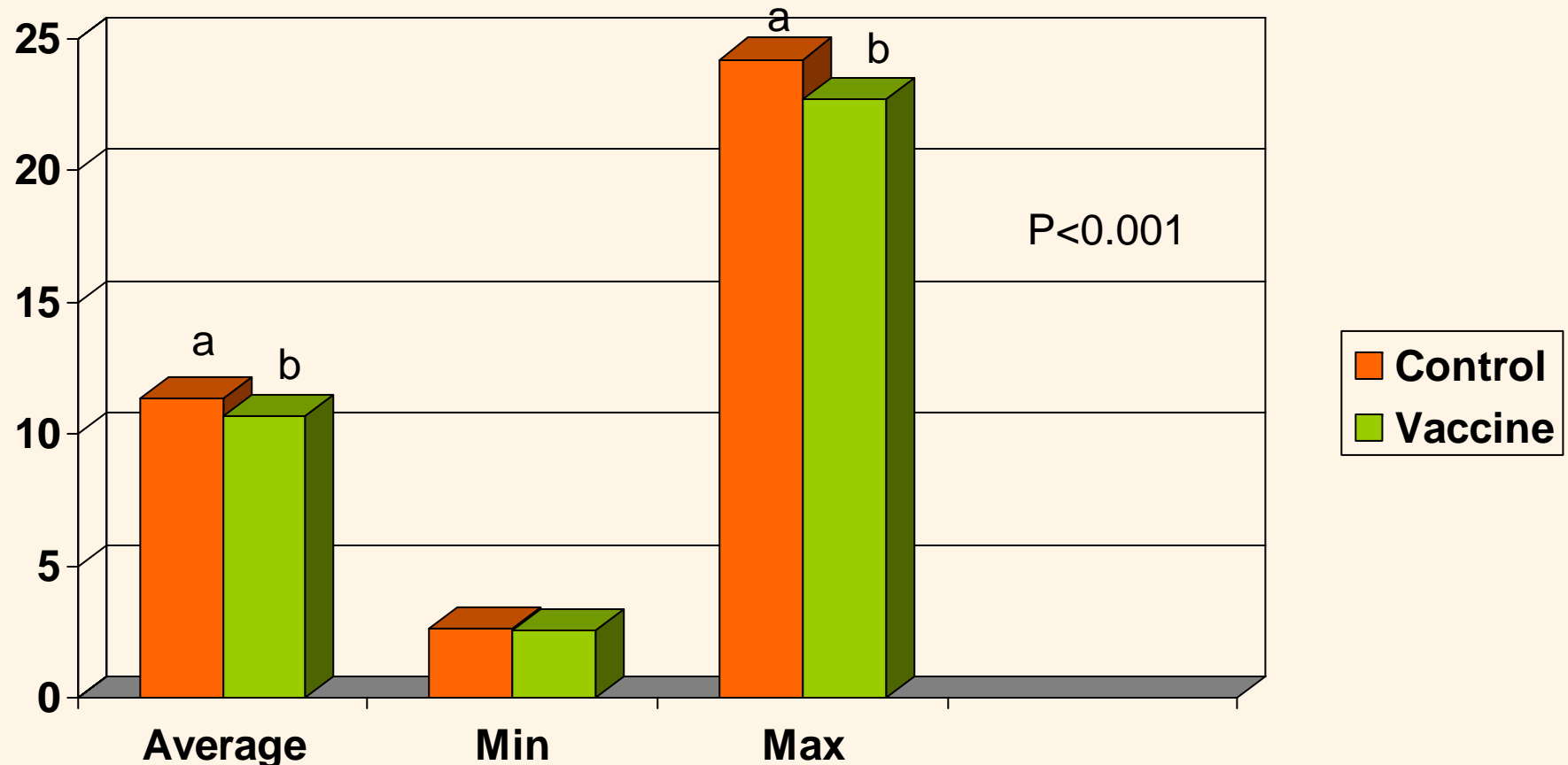
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Up to 4 d prior to being pulled by d



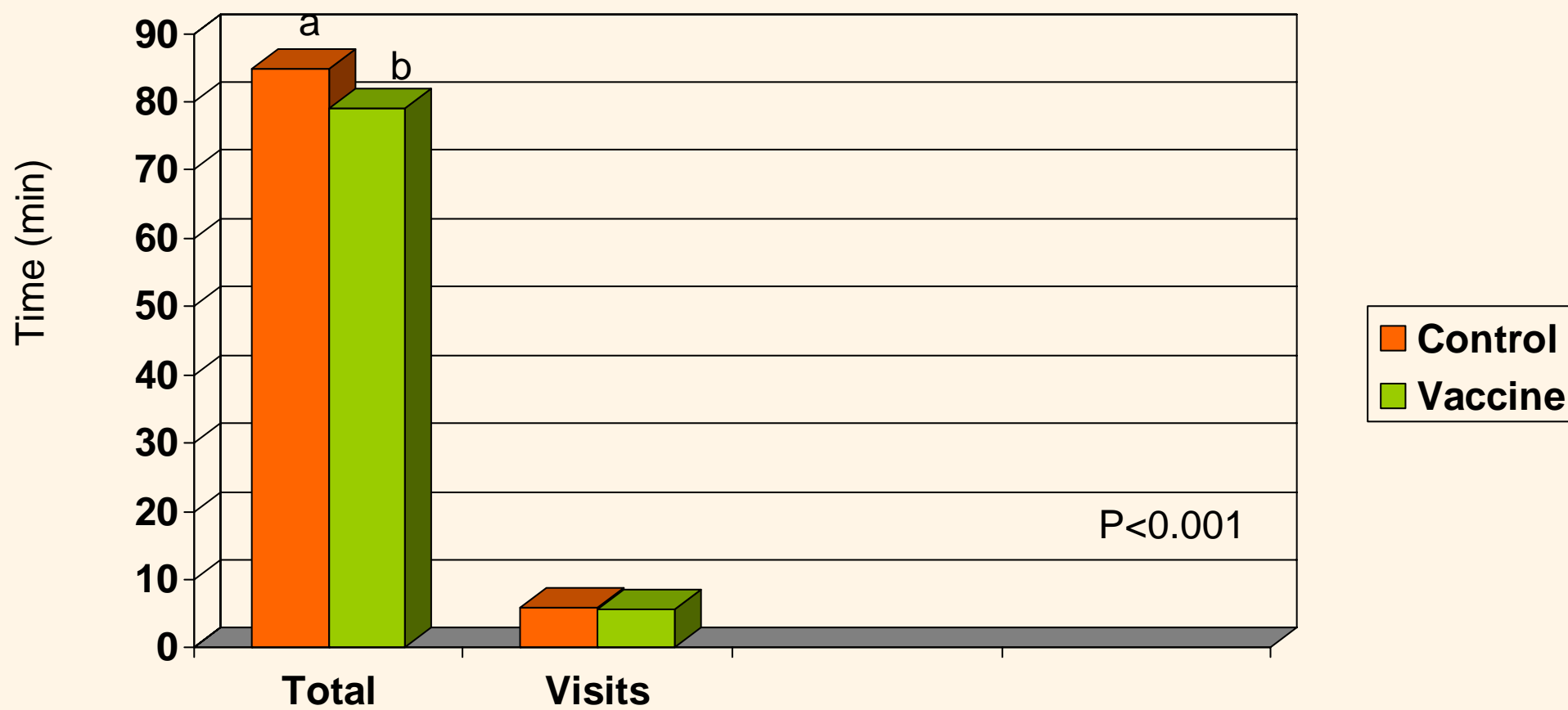
# Did sick calves administered vaccine have different bunk attendance durations than sick calves not given the vaccination?

Entire trial by d

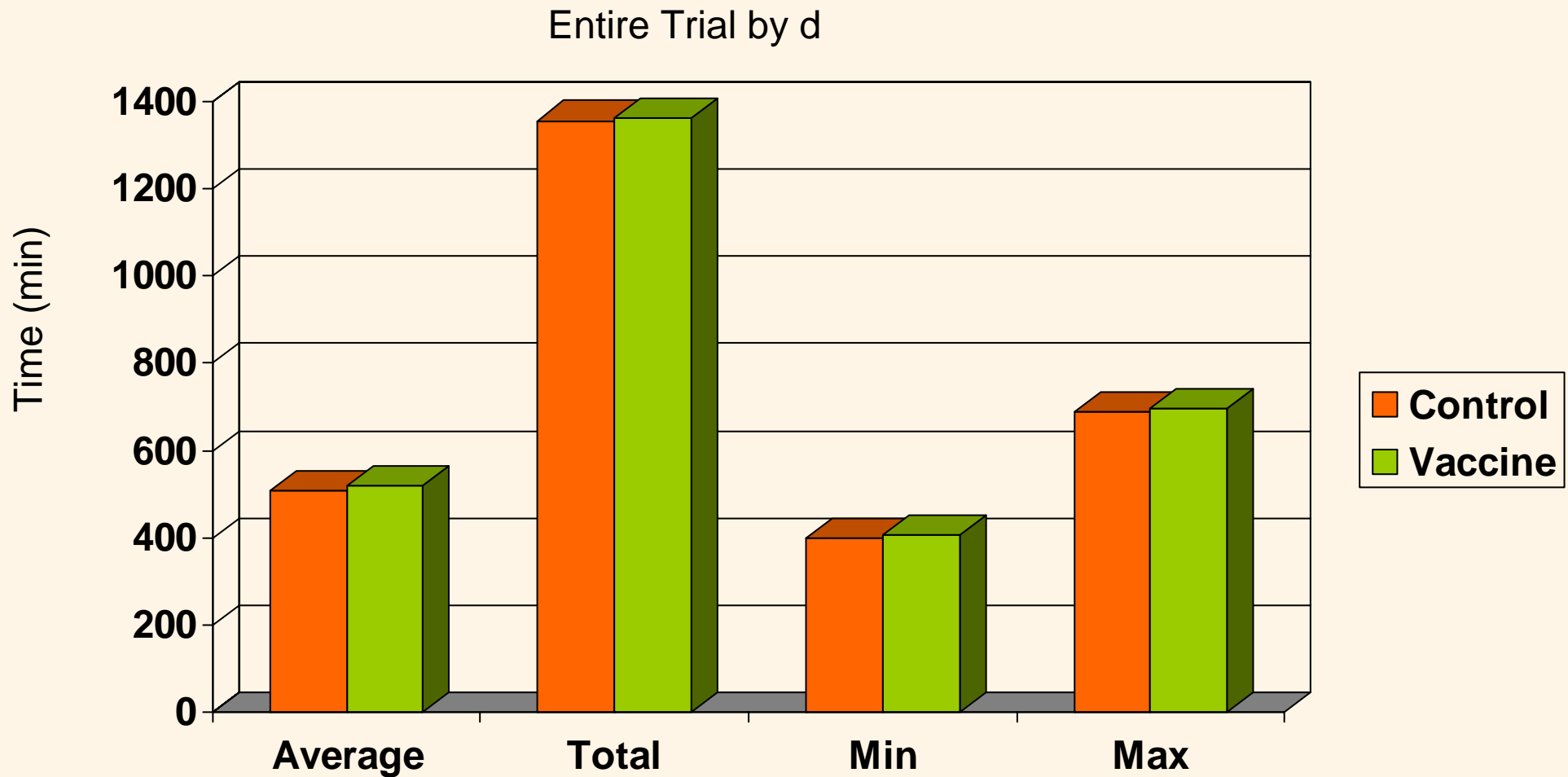




Entire Trial by d

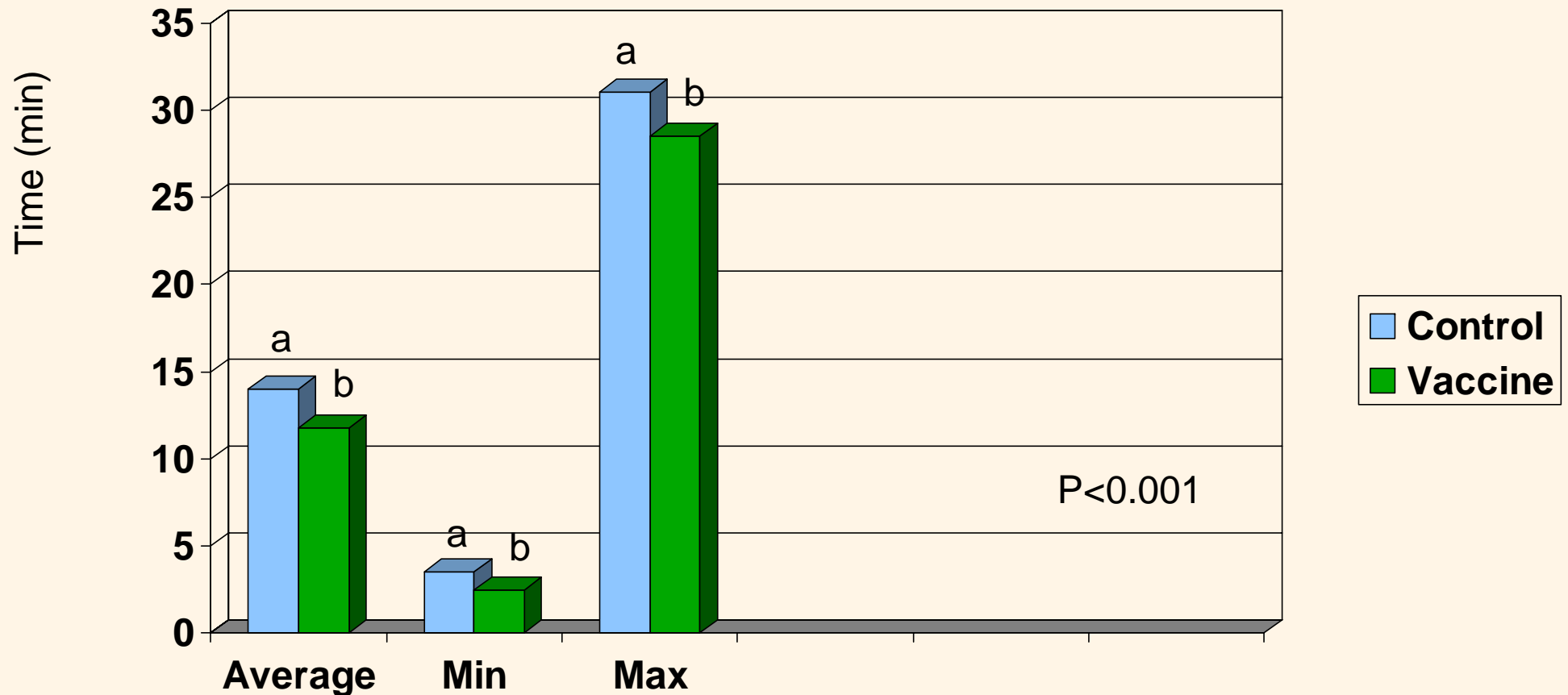


# Did sick calves administered vaccine have different inter-meal intervals than sick calves not given the vaccination?

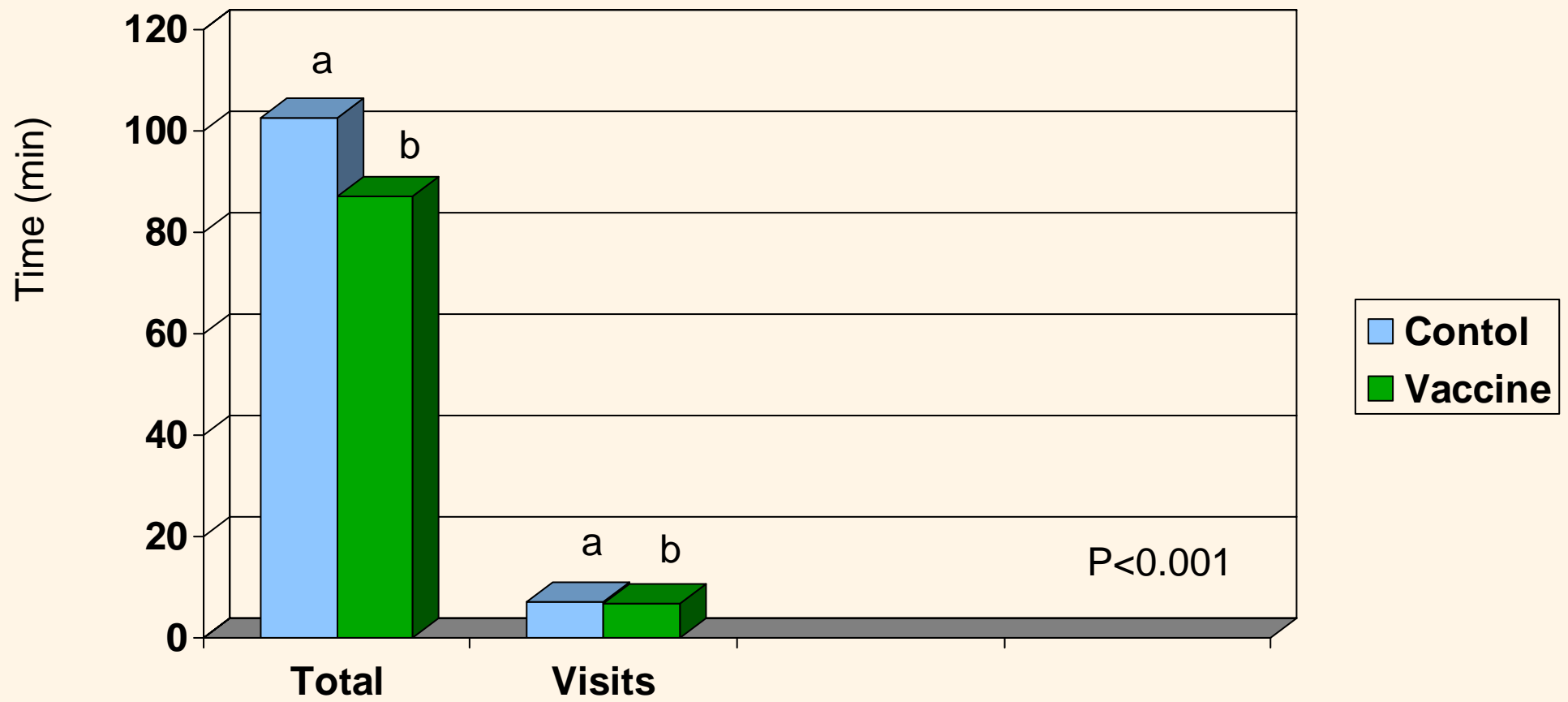


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Up to 4 d prior to being pulled by d

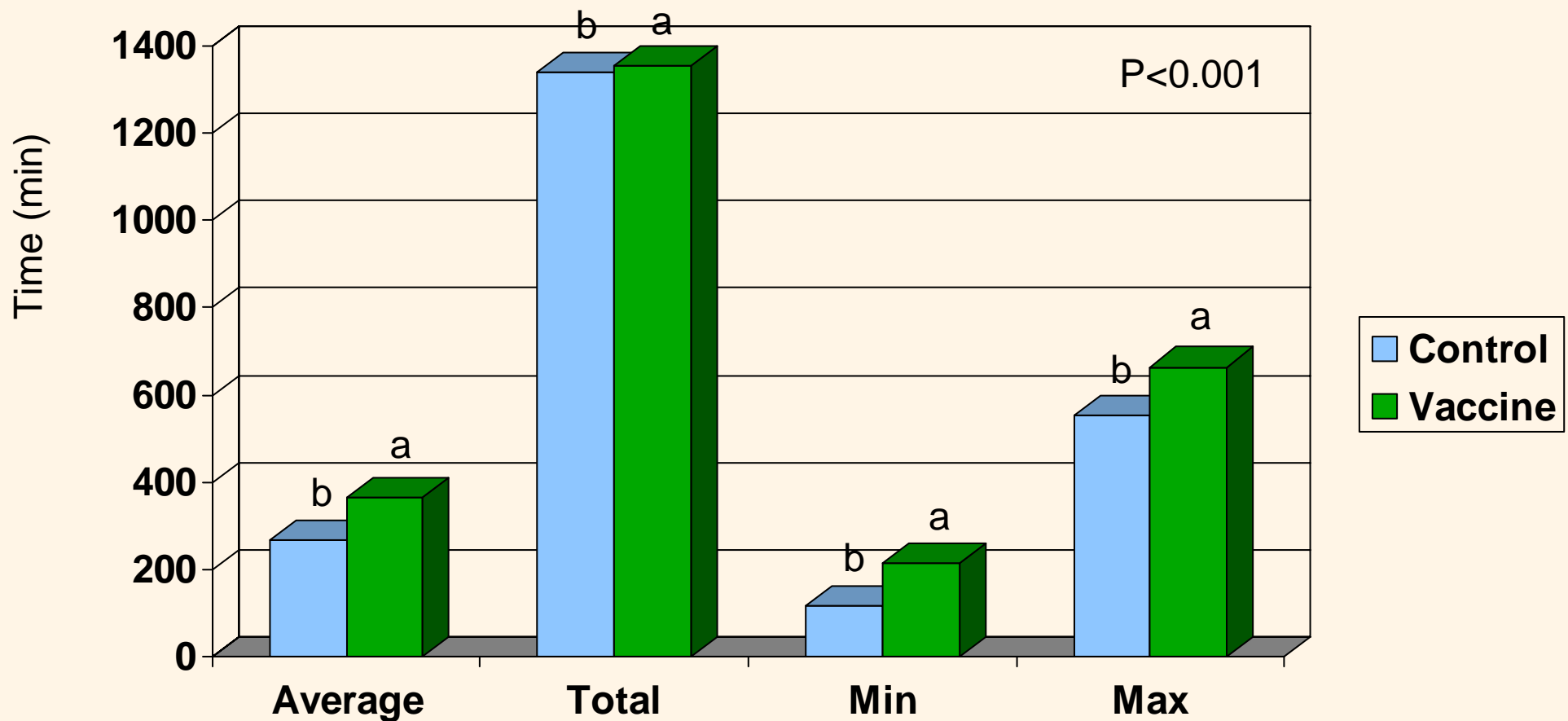


Up to 4 d prior to being pulled by d

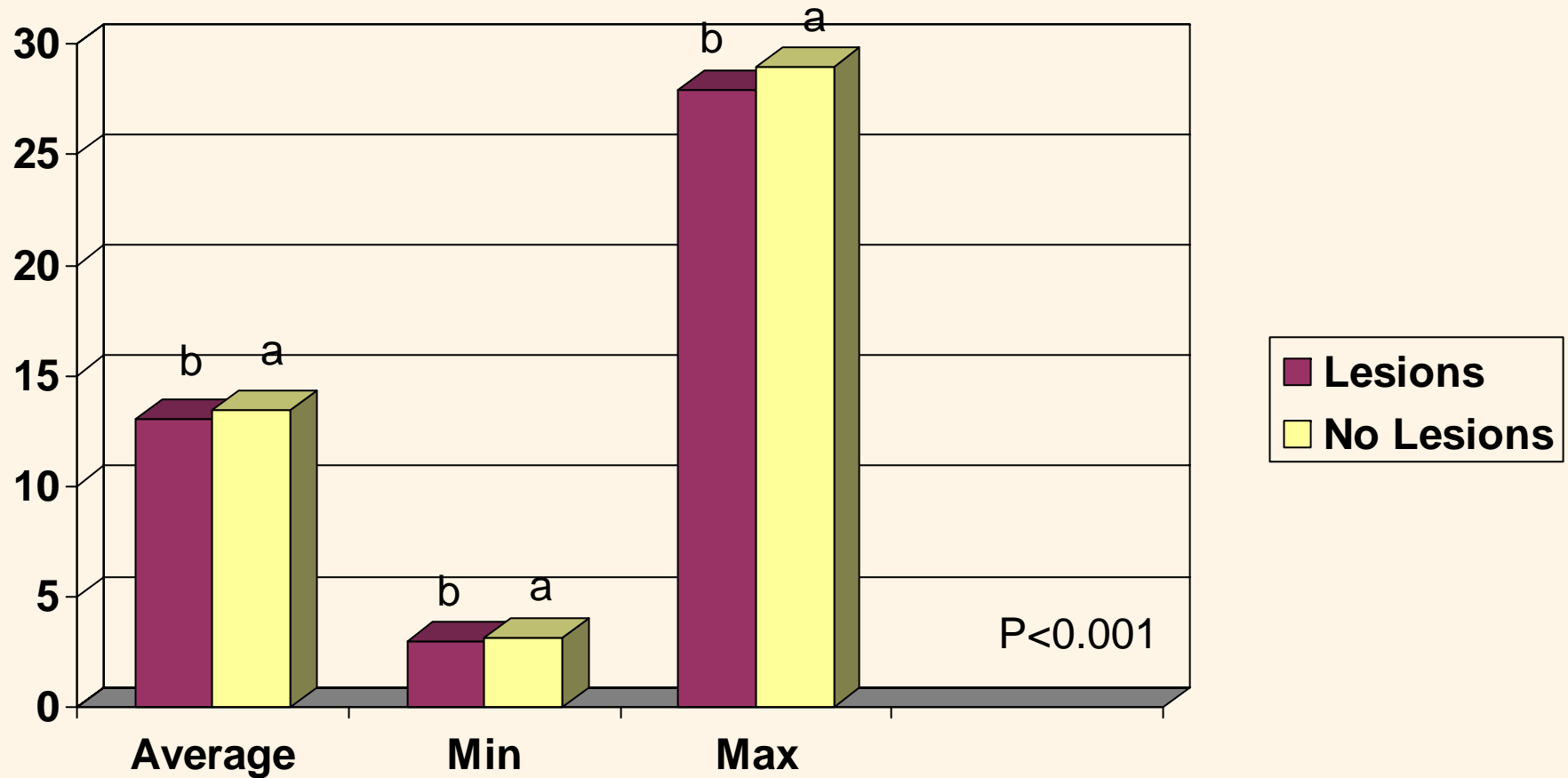


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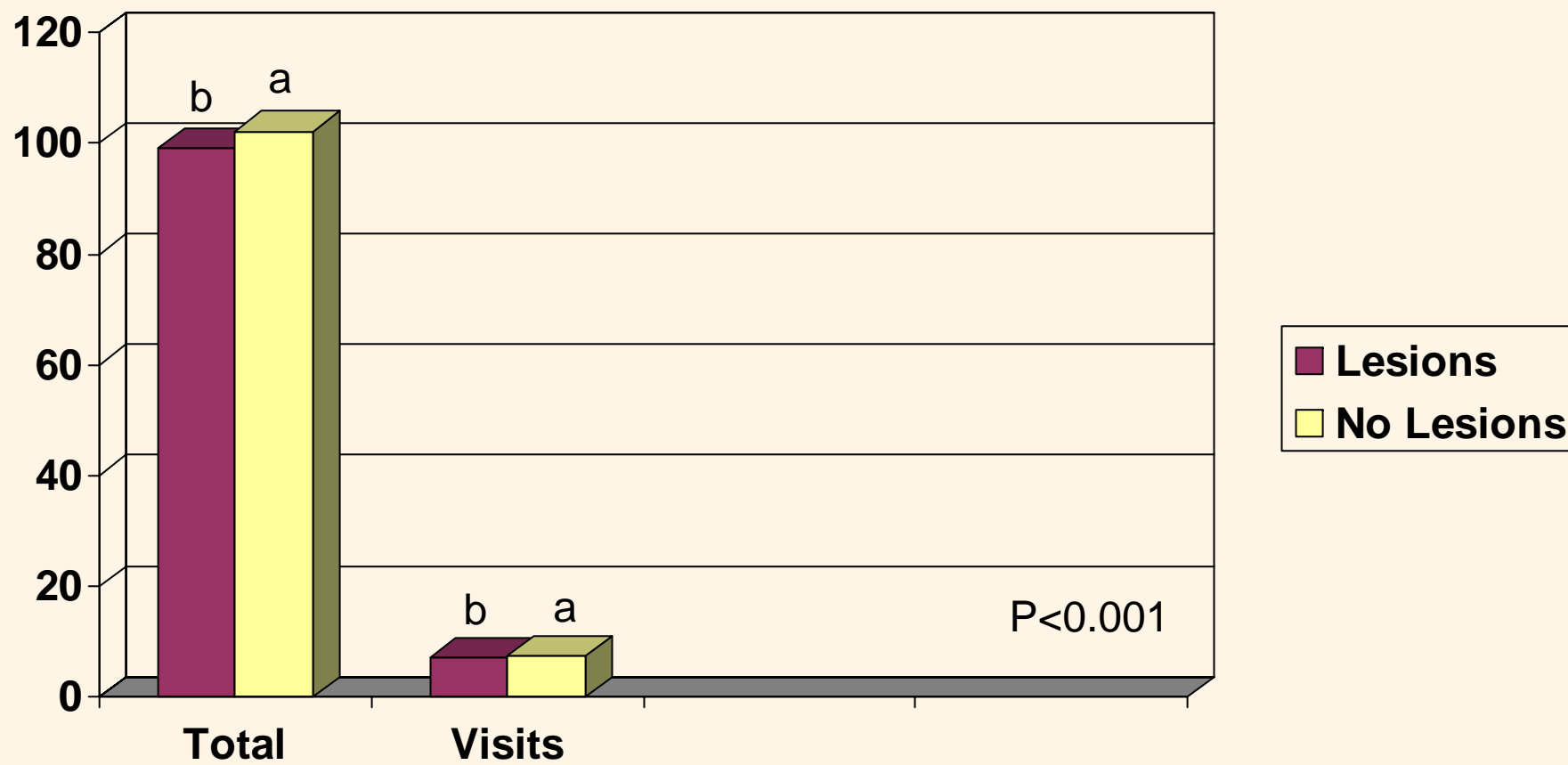
Up to 4 d prior to being pulled by d



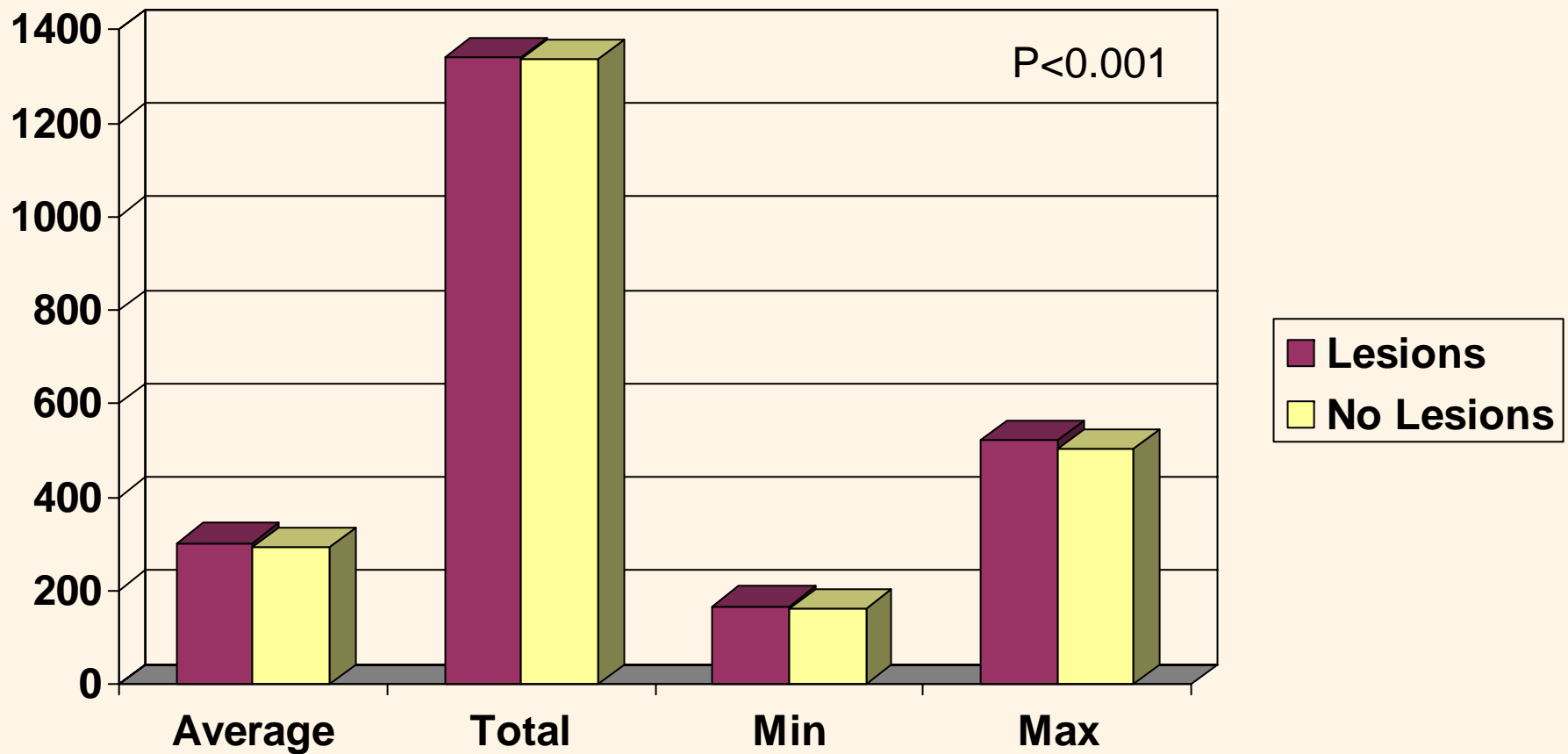
# Did cattle with or without lung lesions have different feeding durations and visits overall?



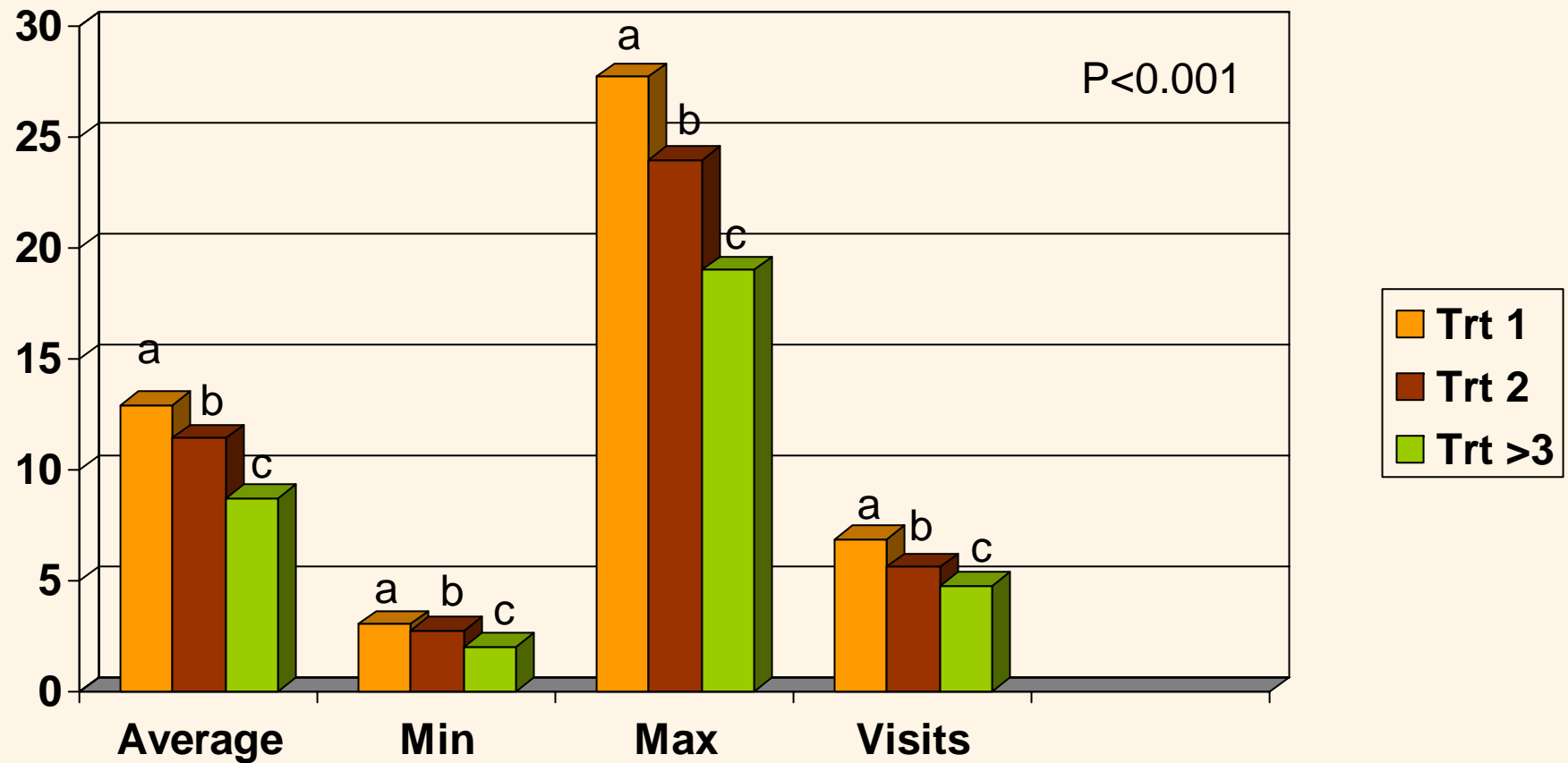


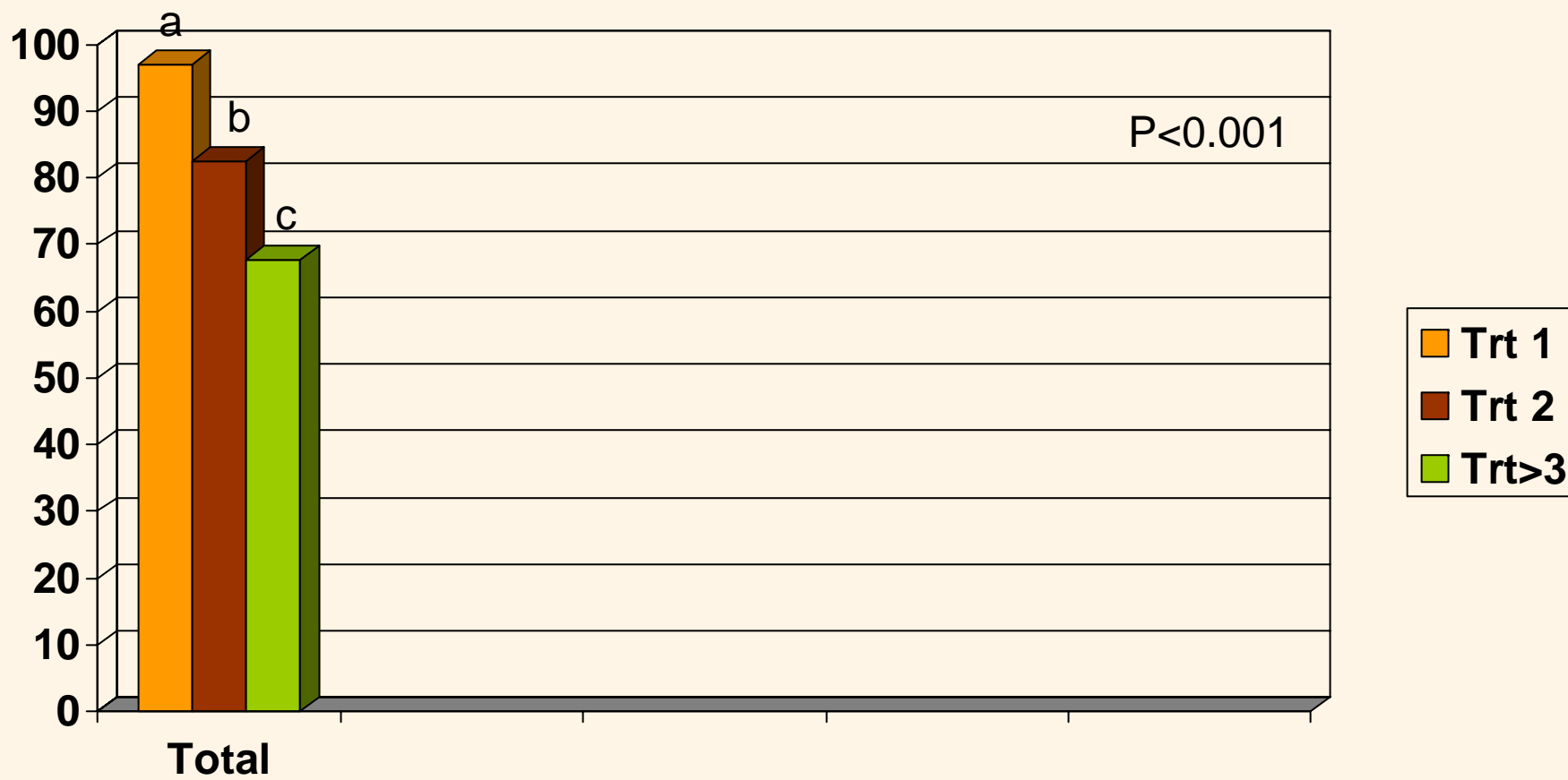


# Did cattle with or without lung lesions have different inter-meal intervals?



# Relationship between times treated and bunk attendance







	# Trts	ADG	Liver Score	Lung Score
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*Low category*

Control	2.97a	2.54c	.67a	.18a
Vaccine	2.21b	2.64a	.44b	.08b

*Med category*

Control	2.31c	2.57b	.49b	.17a
Vaccine	1.78d	2.63a	.46b	.08b

*High category*

Control	2.32bc	2.61a	.38bc	.14a
Vaccine	1.81d	2.61a	.54ab	.08b

P value = 0.001

# Other Questions

- When do sick eat relative to healthy?
- Do sick maintain diurnal pattern?
- Feeding pattern related to truck delivery?
- Where there are differences can activity during specific periods of the day explain those obtained over a 24 h period?





# ***Conclusion and Implications***

- Feeding behaviour has use in:
  - Screening for the early detection of animals in need of therapeutic treatment
  - Assessment of antimicrobials
  - Drug treatment regimes
  - Animal management



# *Future*

- All other studies retrospective
- Define behaviour
- Test criteria on “new” studies
- Correlation to physiology (IRT, immune status)
- Other behaviour

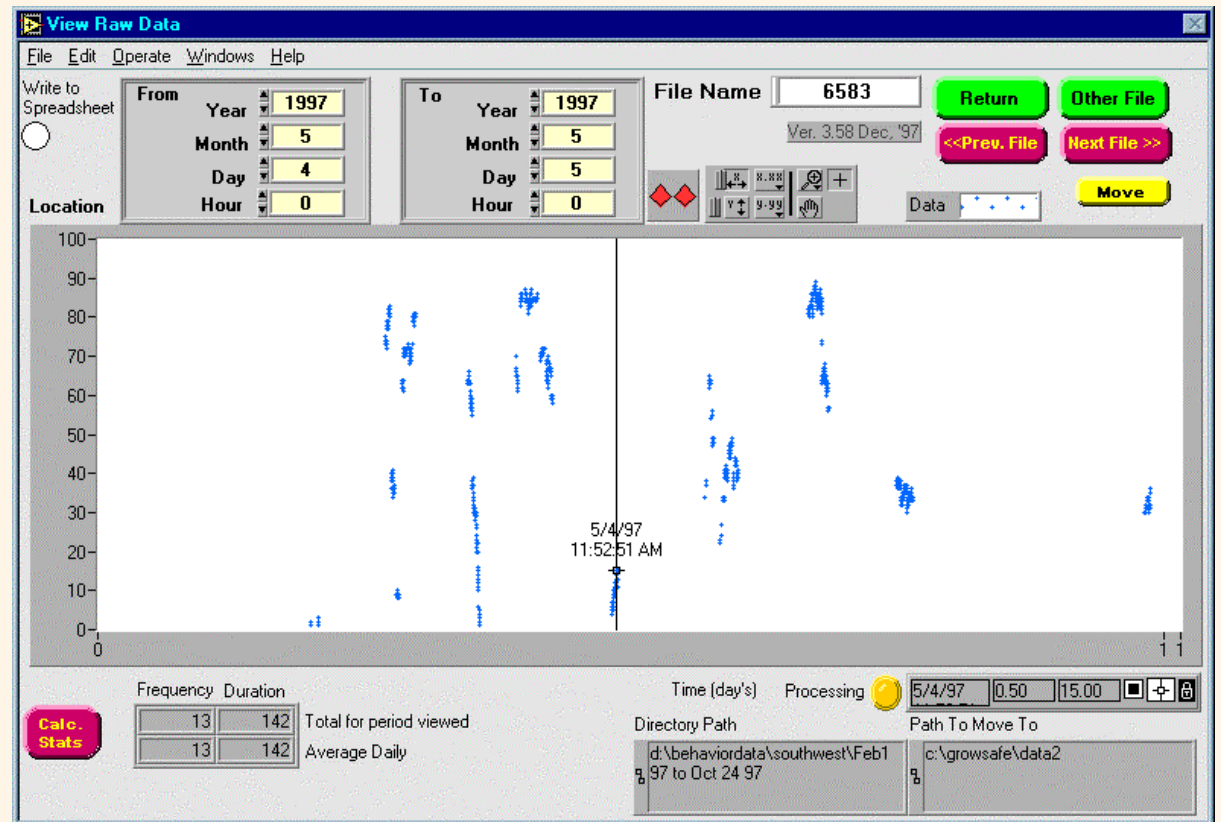




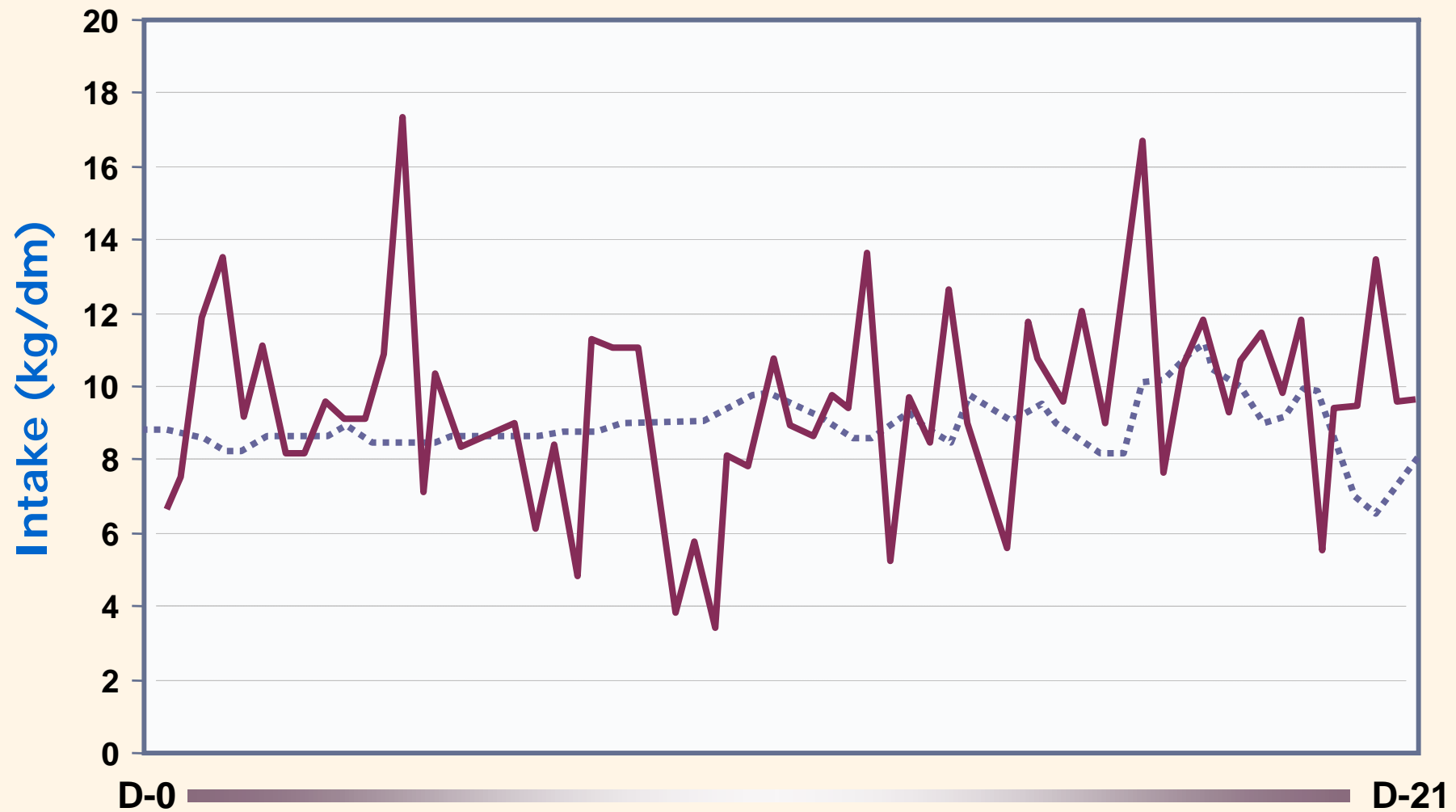


# Computer modelling ?

- Neural network
- Pattern recognition



# High ADG steer





# High ADG steer



