Environment and Management Factors Influencing Antibody Levels and Response in Weanling Calves

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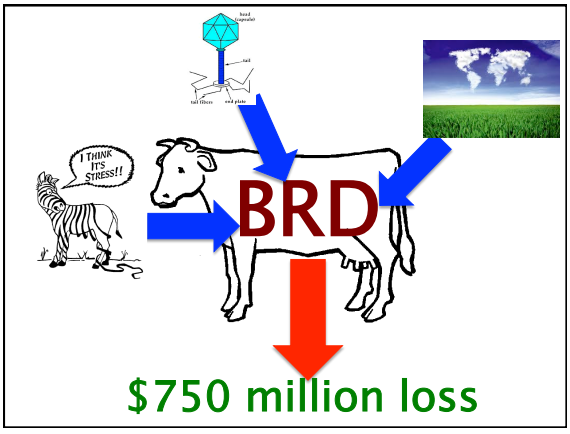
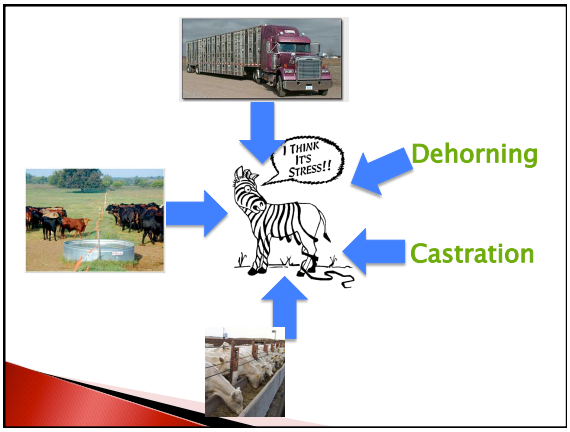
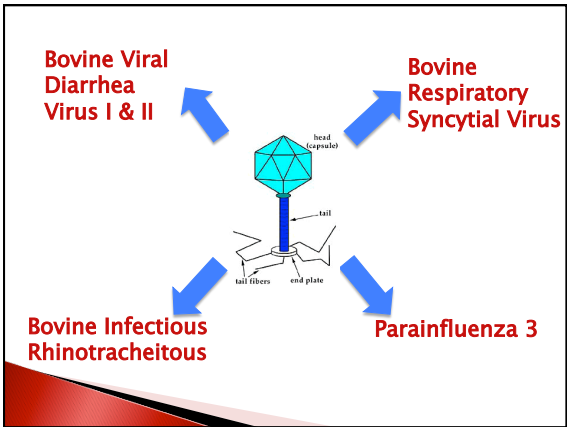
Overview

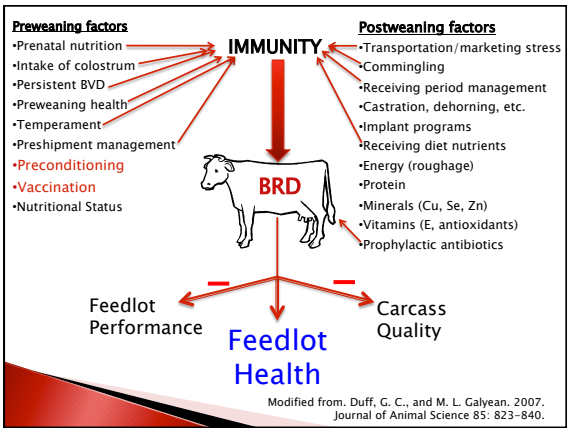
- Vaccination is a primary prevention against respiratory disease
- Maternal antibodies adversely affect response to vaccination
- Stressors suppress the immune system, and inhibit antibody response
- Age in which calves are most likely to have enhanced response to vaccinations are variable

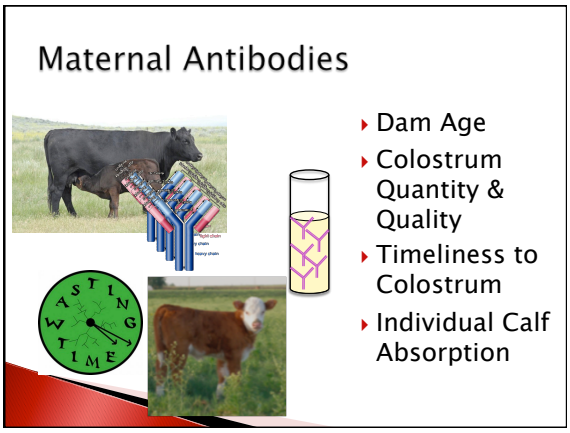


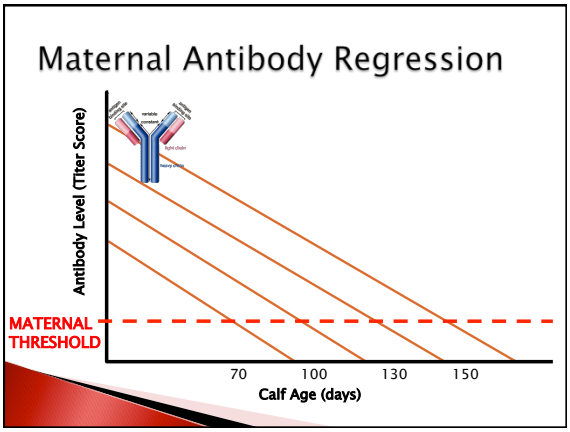


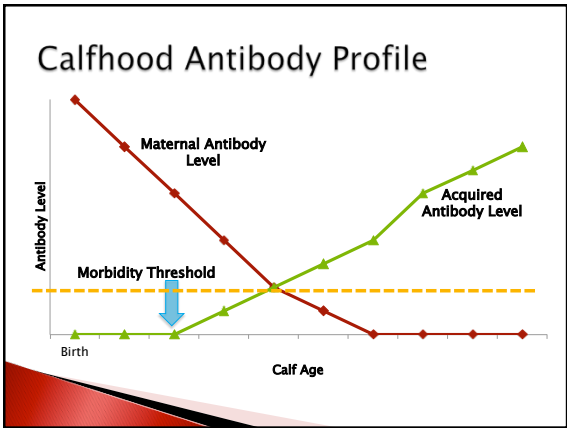


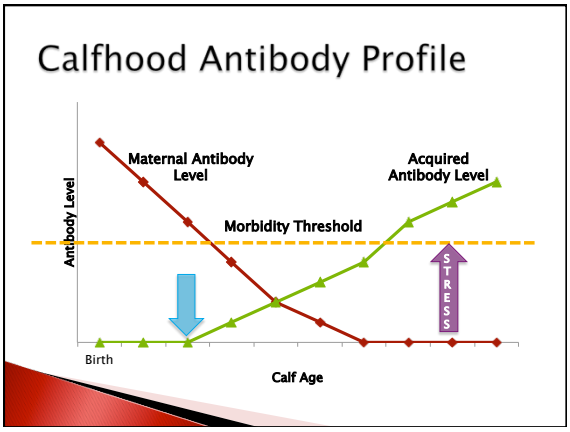
Environmental Effects

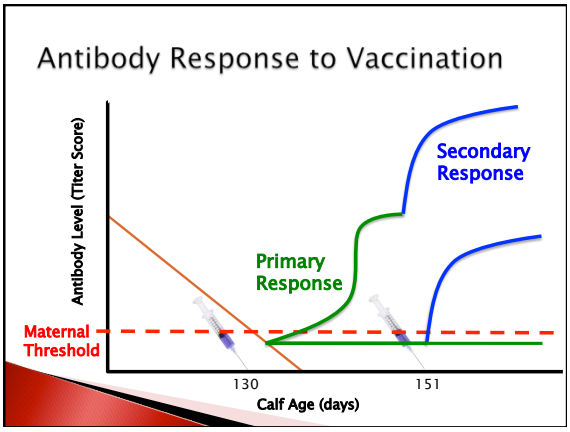

Preweaning factors
•Prenatal nutrition
•Intake of colostrum
•Persistent BVD
•Preweaning health
•Temperament
•Preshipment management
•Preconditioning
•Vaccination
•Nutritional Status
IMMUNITY
BRD
Postweaning factors
•Transportation/marketing stress
•Commingling
•Receiving period management
•Castration, dehorning, etc.
•Implant programs
•Receiving diet nutrients
•Energy (roughage)
•Protein
•Minerals (Cu, Se, Zn)
•Vitamins (E, antioxidants)
•Prophylactic antibiotics
Feedlot Performance
Feedlot Health
Carcass Quality
Modified from. Duff, G. C., and M. L. Galyean. 2007. Journal of Animal Science 85: 823-840.


Maternal Antibodies
Dam Age
Colostrum Quantity & Quality
Timeliness to Colostrum
Individual Calf Absorption
STING
WATT
TIME


Maternal Antibody Regression
Antibody Level (Titer Score)
MATERNAL THRESHOLD
70
100
130
150
Calf Age (days)


Calfhood Antibody Profile
Maternal Antibody Level
Acquired Antibody Level
Antibody Level
Morbidity Threshold
Birth
Calf Age


Calfhood Antibody Profile
Maternal Antibody Level
Acquired Antibody Level
Antibody Level
Morbidity Threshold
STRESS
Birth
Calf Age

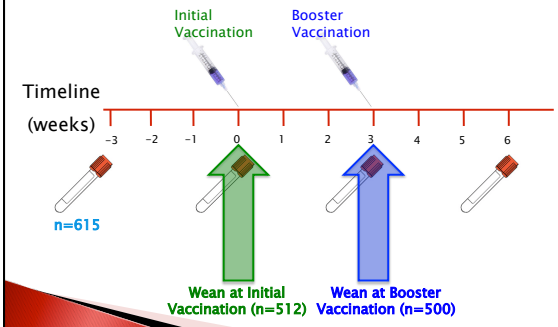

Antibody Response to Vaccination
Antibody Level (Titer Score)
Secondary Response
Primary Response
Maternal Threshold
130
151
Calf Age (days)

Materials and Methods

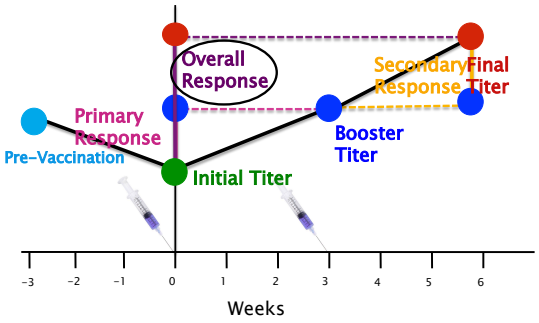
Animal Population

- 1,012 American Angus Calves
- Animals by year and season
  - 2007 Spring: n=197
  - 2007 Fall: n=137
  - 2008 Spring: n=215
  - 2008 Fall: n=139
  - 2009 Spring: n=220
  - 2009 Fall: n=104

Vaccination Protocol

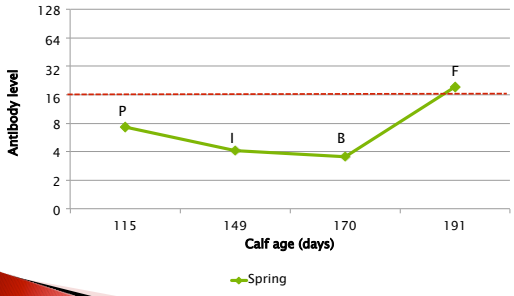


Antibody Level Variables

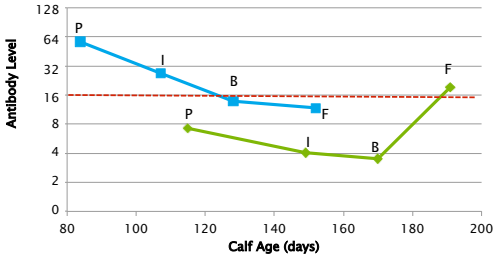


Results

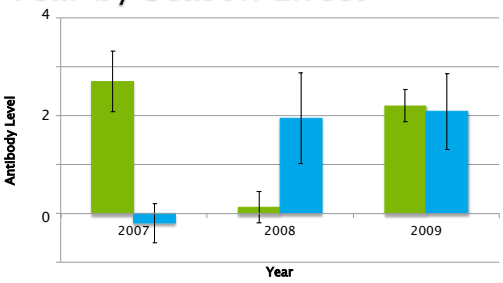
Spring Calf Response



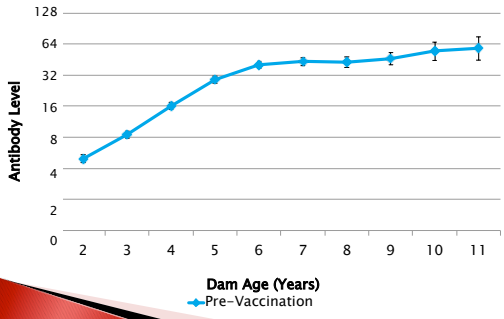
Seasonal Response



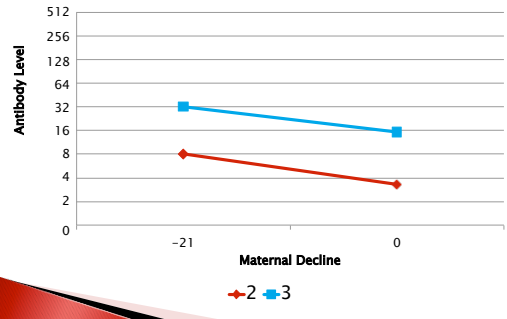
Year by Season Effect



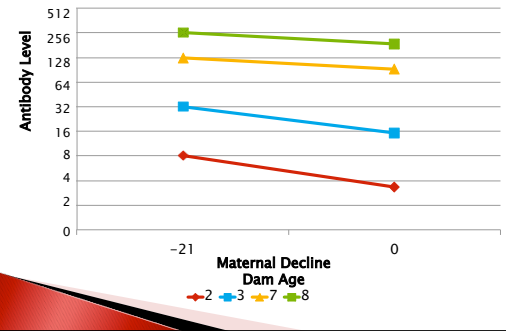
Maternal Antibody Acquisition



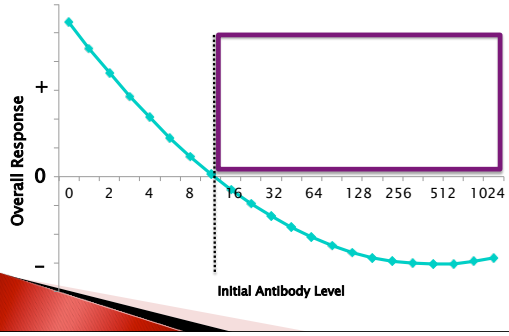
Maternal Antibody Decline



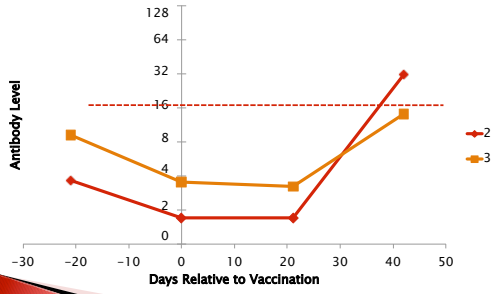
Maternal Antibody Decline



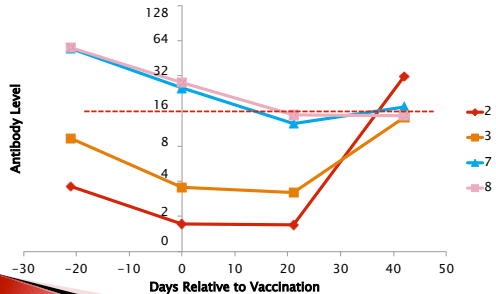
Maternal Antibody Blocking



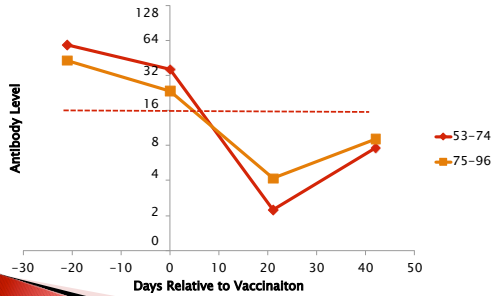
Maternal Antibody Interference From Young Dams



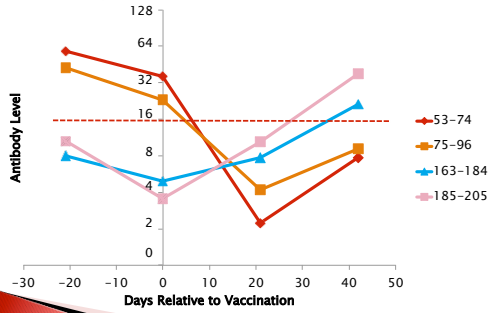
Maternal Antibody Interference by Dam Age



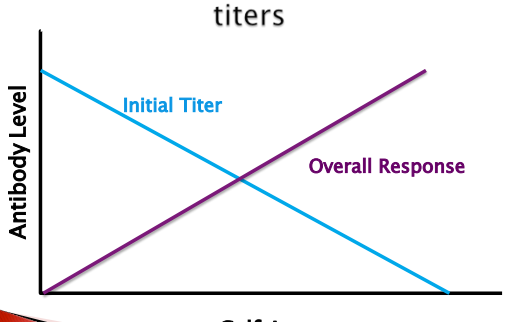
Calf Age Influence



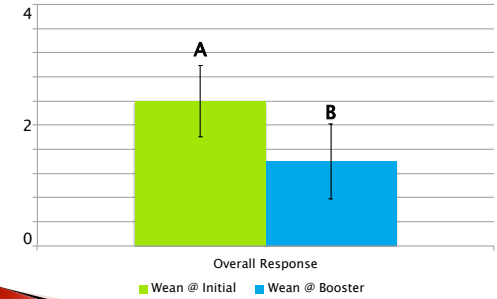
Calf Age Influence



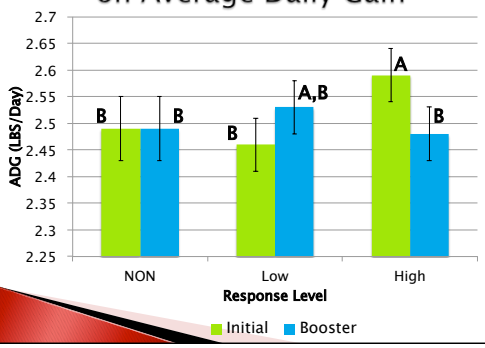
Associations between calf age and titers



Weaning Stress Interference



Response and Weanstress Effects on Average Daily Gain



Conclusions

- Individual animal response is influenced by
  - Season
  - Year
- Age of Dam influences amount of passive antibodies acquired
  - 5-9 year old dams transfer the greatest amount of passive antibodies
  - Rate of decay of maternal antibodies varies with dam age

- Passive antibodies at the time of vaccination can interfere with response to vaccination
  - Calves with lower maternal antibodies at the time of vaccination have a greater response
  - The amount of passive antibodies influences age at which to vaccinate calves
- Optimum age at initial vaccination varies
  - Dam age distribution
  - Stressors: time of weaning
  - Season

- Weanstress adversely affects response to vaccination
  - Weaning at initial vaccination elicits a greater overall response to vaccination

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