

Human prenatal nutrition

- Compromised fetal or neonatal growth originates from;
 - maternal caloric restriction
 - protein restriction
 - iron restriction
 - thermal stress
 - high altitude conditions

Human prenatal nutrition

- Leads to physiological programming;
 - serious health consequences in later life
 - cardiovascular disease
 - diabetes
 - High blood lipids
 - obesity
 - reduced immune function

Colostrum and Passive Immunity in beef cattle

- At birth incomplete disease defenses
- Colostrum intake provides immunoglobulins
- Contains 2 times protein (22%)
 - Immunoglobulins & casein
 - Fat
 - Vitamins
 - Digestion inhibitor
- Volume 0.6 to 1.7 liters (cow nutrition)

Time after birth and Colostrum Absorption

Hrs after birth	Concentration mg/mL 24 hrs	Absorption %
6	52.7	66
12	37.5	47
24	9.2	12
36	5.4	7
48	4.8	6

Effects of Calving Difficulty on Serum Immunoglobulins, time to stand & mothering score

CALVING DIFFICULTY SCORE

	1 unassisted	2 Easy pull	3 Difficult pull
Time calving to standing (mins)	39	50	84
Mothering score	1.2	1.5	1.5
Serum IgG mg/mL	194	173	135

Effect of Body Condition on Newborn Calves

body condition score at calving

	3 very thin	4 thin	5 average	6 good
Time calving to standing (mins)	59	63	43	35
Serum IgG mg/mL	1998	2178	2309	2348

Lifetime of colostrum consumption of calf performance

(Perino – West Texas A&M)

	Colostrum intake Inadequate	Colostrum intake adequate
neonatal	30% sick 6 times more likely	5% sick
Birth to weaning	5 times more likely 30 lbs less @ weaning	
feedlot	3 times more likely ADG .1 lbs less	

Effects of under nutrition in late pregnancy (West Virginia)

Cow Nutrition

57%

100%

Calf responses

cortisol ng/mL 33.8

26.1

colostrum IgG 43.0

40

mg/mL

serum IgG 17.2

22.0*

P=0.07

Effects of under nutrition in late pregnancy (Clay Center, NE)

- 263 cross bred calves evaluated role passive transfer at birth
 - More calves died prior to weaning than those with higher IgG at birth ($P < .01$)
 - Greater feedlot morbidity & respiratory problems with lower plasma protein at birth
 - Conclusion – cow calf producers benefit from management for passive transfer

Summary

- Cow nutrition influences
 - Volume colostrum
 - Time to stand
 - Calf serum IgG
 - Morbidity
 - productivity



Part III Experimental Results Corona Range & Livestock Research Center



Effects of cow supplementation on calf performance

- Years 2003-2004, 2004-2005 and 2005-2006
- Senior cow herd was used in the “NMSU Small Supplement” study
- Winter/pregnant cows supplementation
 - Objective was to determine if we could reduce supplementation costs without decreasing cow reproductive rate.

NMSU Small supplement study

- Grazing cows received
 - 1 lb per head per day of a **36% crude protein** composed cottonseed meal and wheat middlings
 - **Manager choice**, fed only when manager decided stress required supplementation
 - **Small supplement**, composed of the Corona Range mineral and bypass protein sources that were 80% protein in a 50:50 mix (self fed 6 oz/d)

NMSU Small supplement study

- Protocol
 - 36% CP cows fed supplement 3 times per week (2.3 lbs per feeding) + mineral
 - Tubs for small supplement (SS) filled weekly
 - Manager choice (MC) fed supplement only once in 3 years + mineral
 - Study ran generally from December to middle February (75 to 80 days)

Experimental plan; different winter cow supplement strategies on calf productivity

Pregnant Cow Supplements

1. 36% CP
2. Small supp
3. Manager's choice

Weaned Calves Backgrounding

1. weaning pellets
2. supplement on range

Calves Feedlot Ranch-Rail

1. full feed sold on rail

December-
February

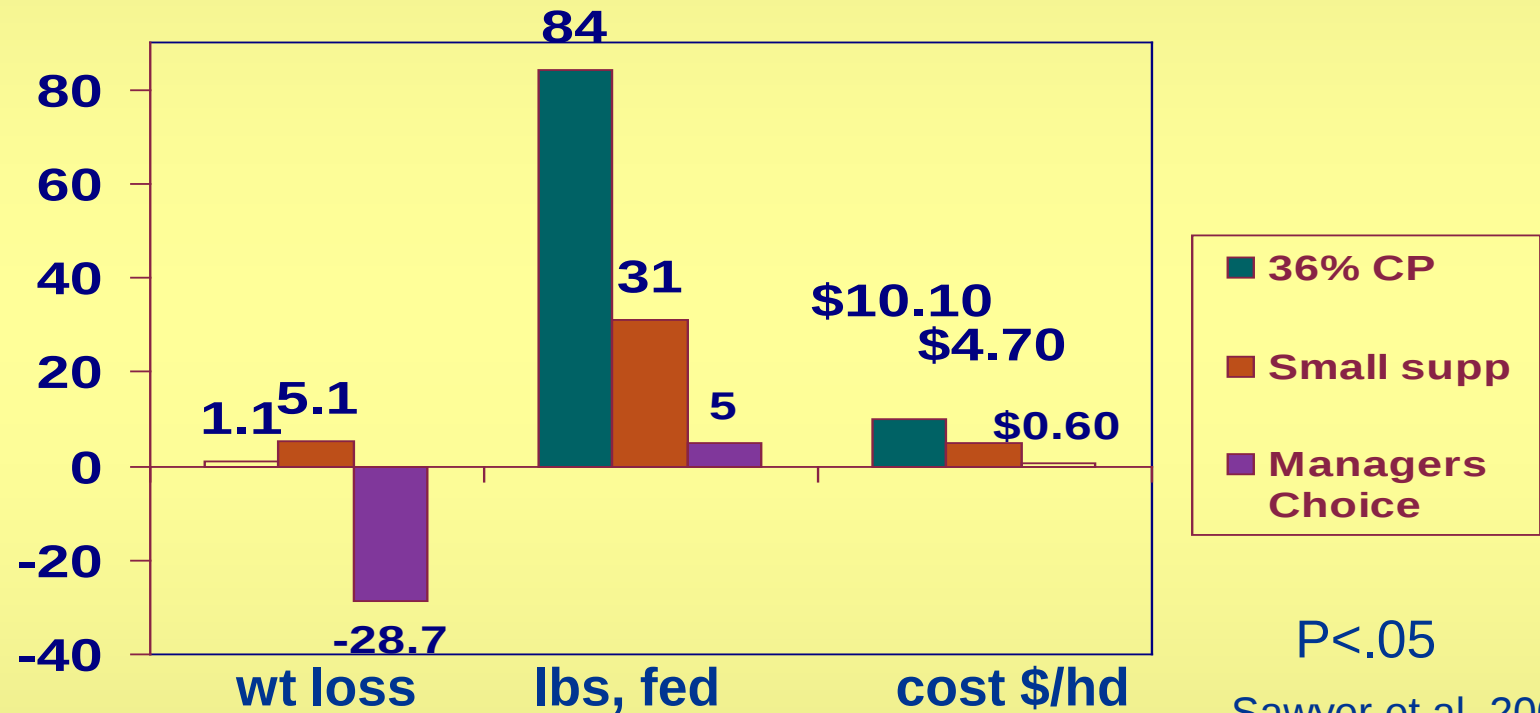
45 days

October-November

November-
June

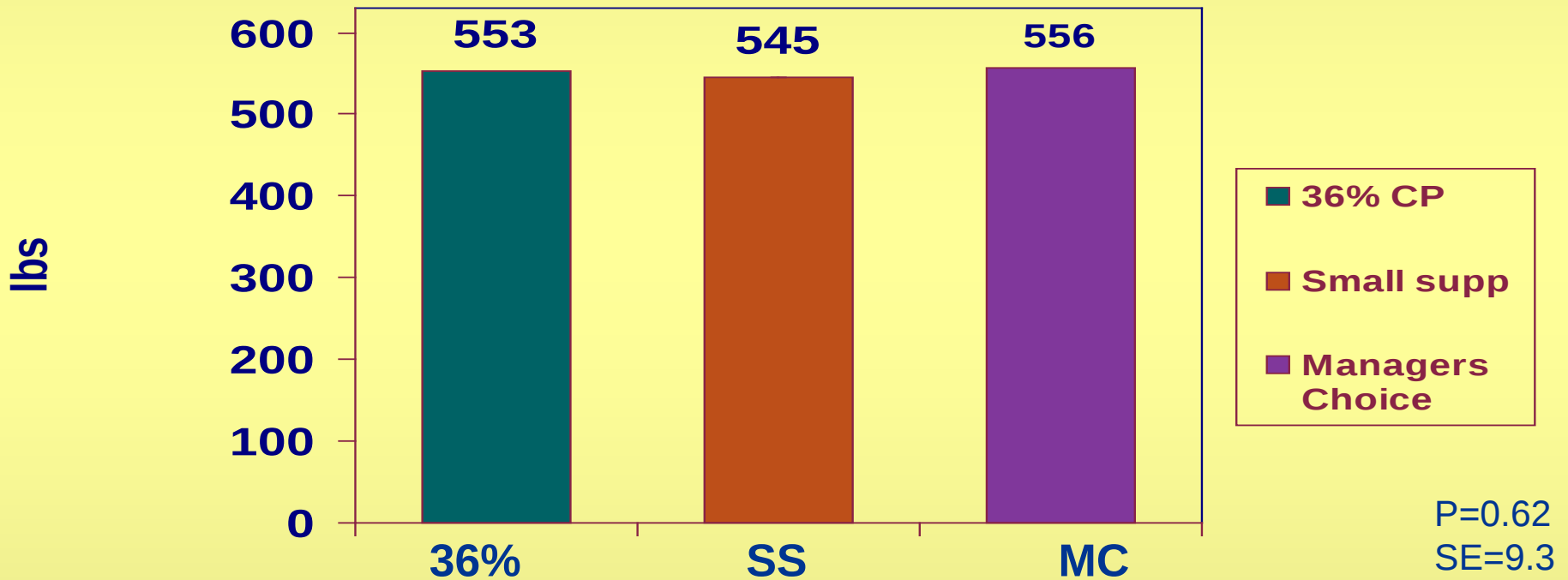
Consumption, weight loss & cost in range cows fed Small Supplement

Results (2003, 4 and 5)



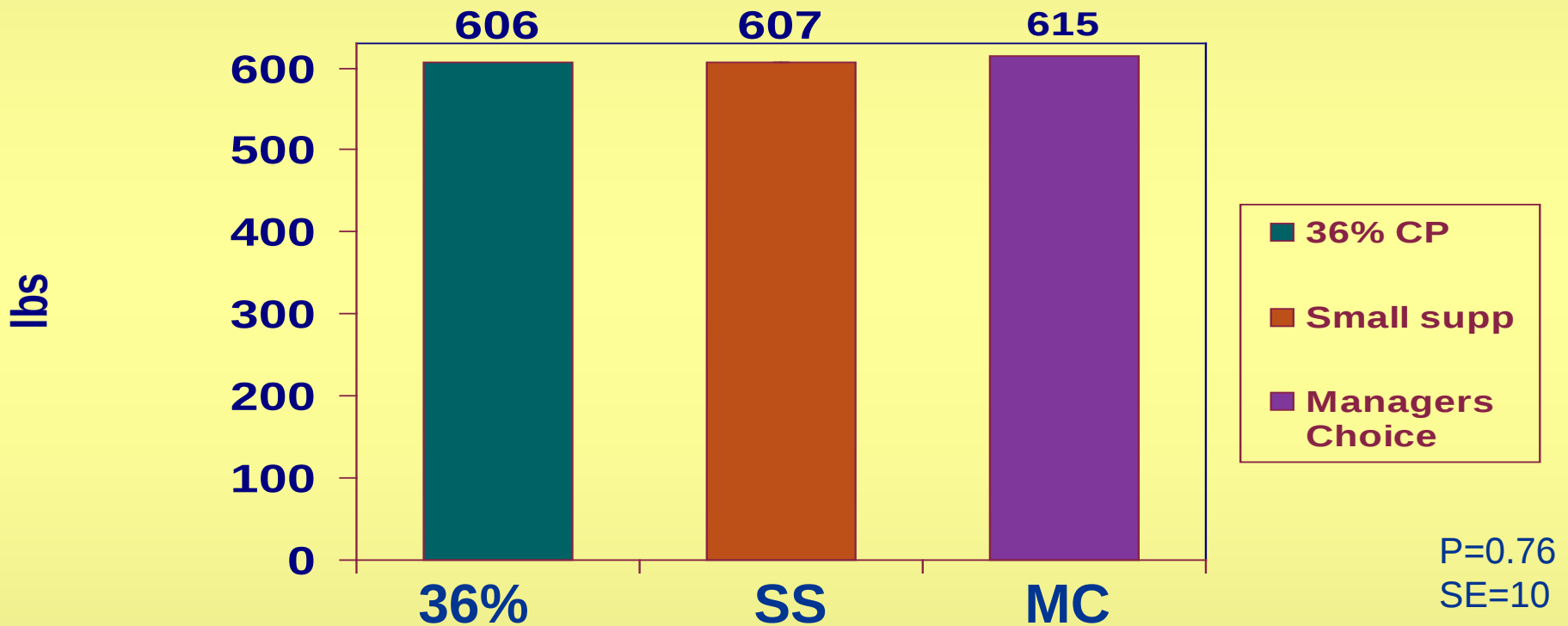
Effect of cow supplement type on calf weaning weight

Results (2003, 4 and 5)



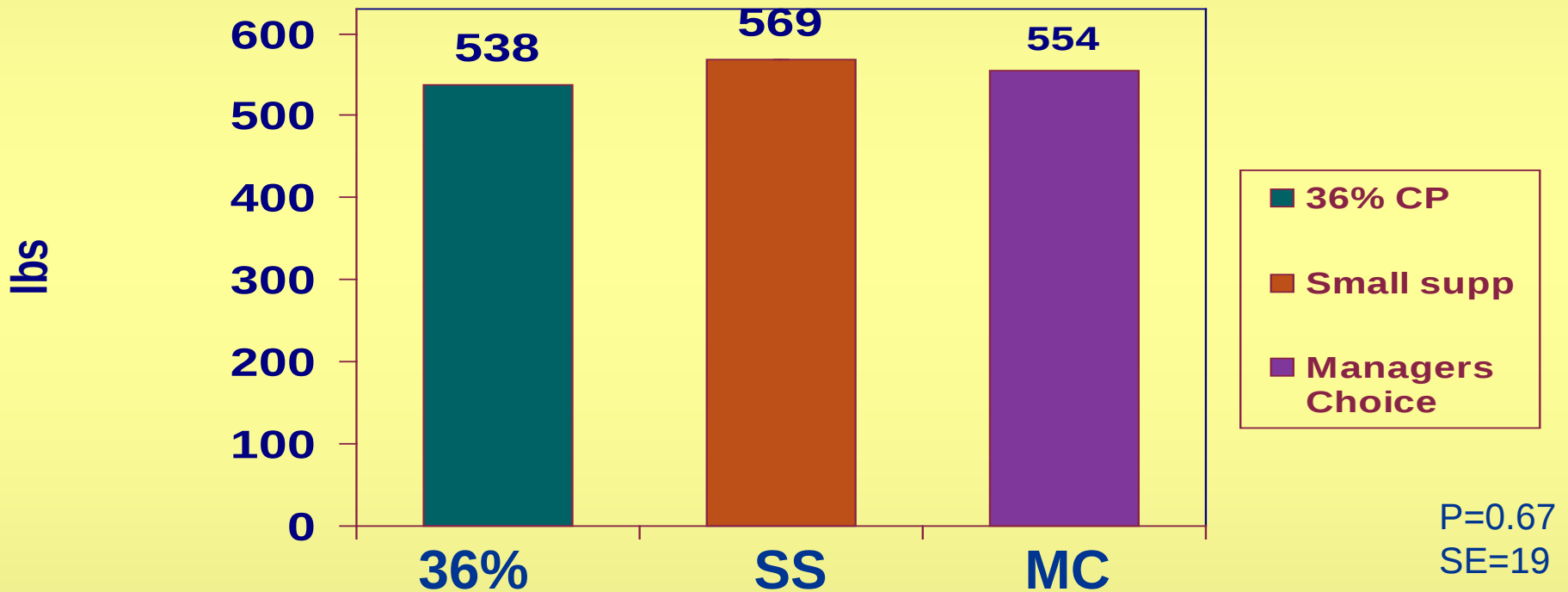
Effect of cow supplement type on calf weight after 45 days backgrounding

Results (2003, 4 and 5)



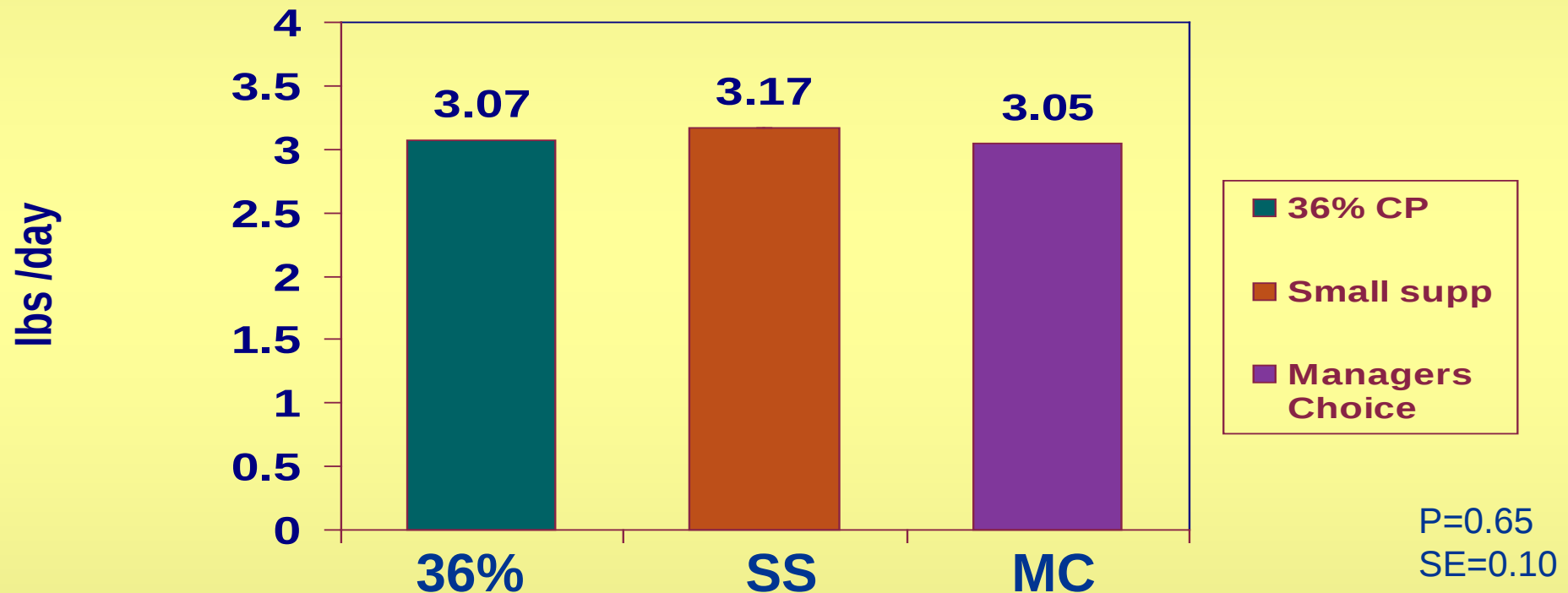
Effect of cow supplement type on calf gain in feedlot (Ranch to rail)

Results (2003, 4 and 5)



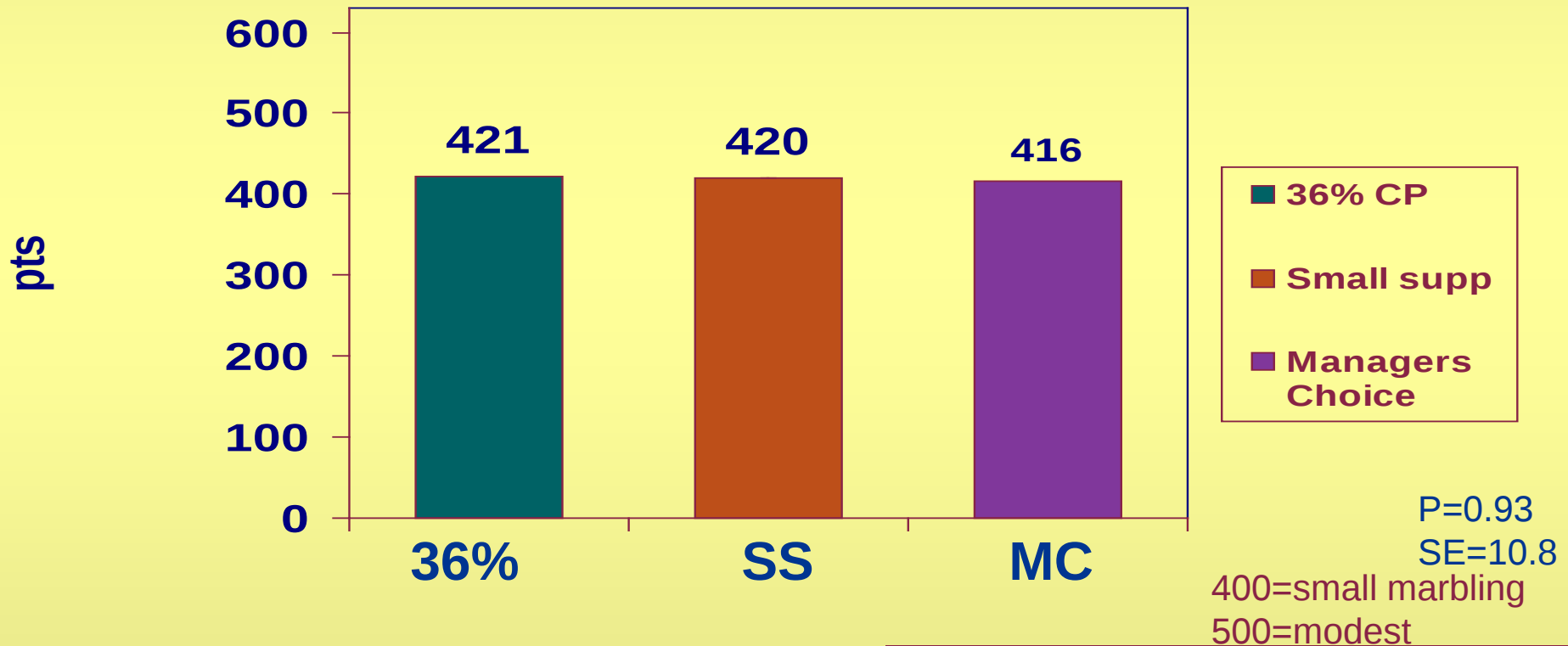
Effect of cow supplement type on calf average daily gain in feedlot (Ranch to rail)

Results (2003, 4 and 5)



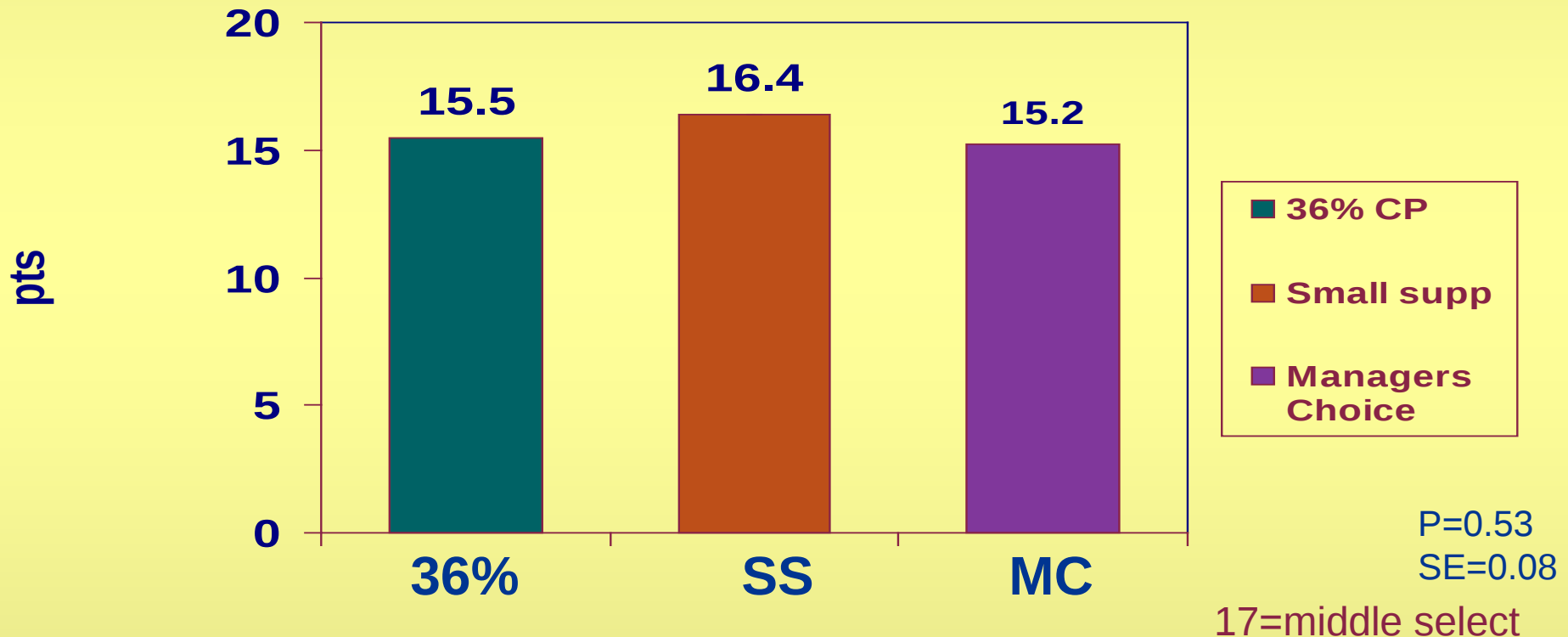
Effect of cow supplement type on calf marbling score at harvest (Ranch to rail)

Results (2003, 4 and 5)



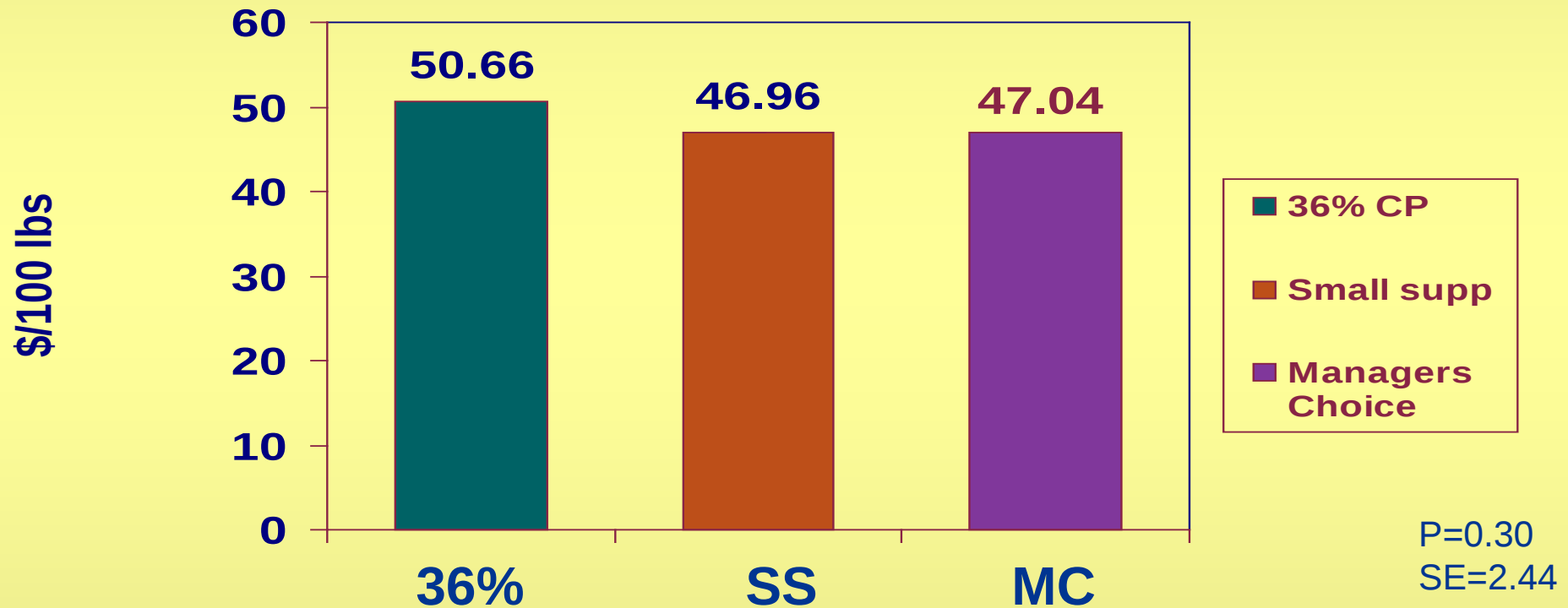
Effect of cow supplement type on calf USDA Quality grade harvest (Ranch to Rail)

Results (2003, 4 and 5)



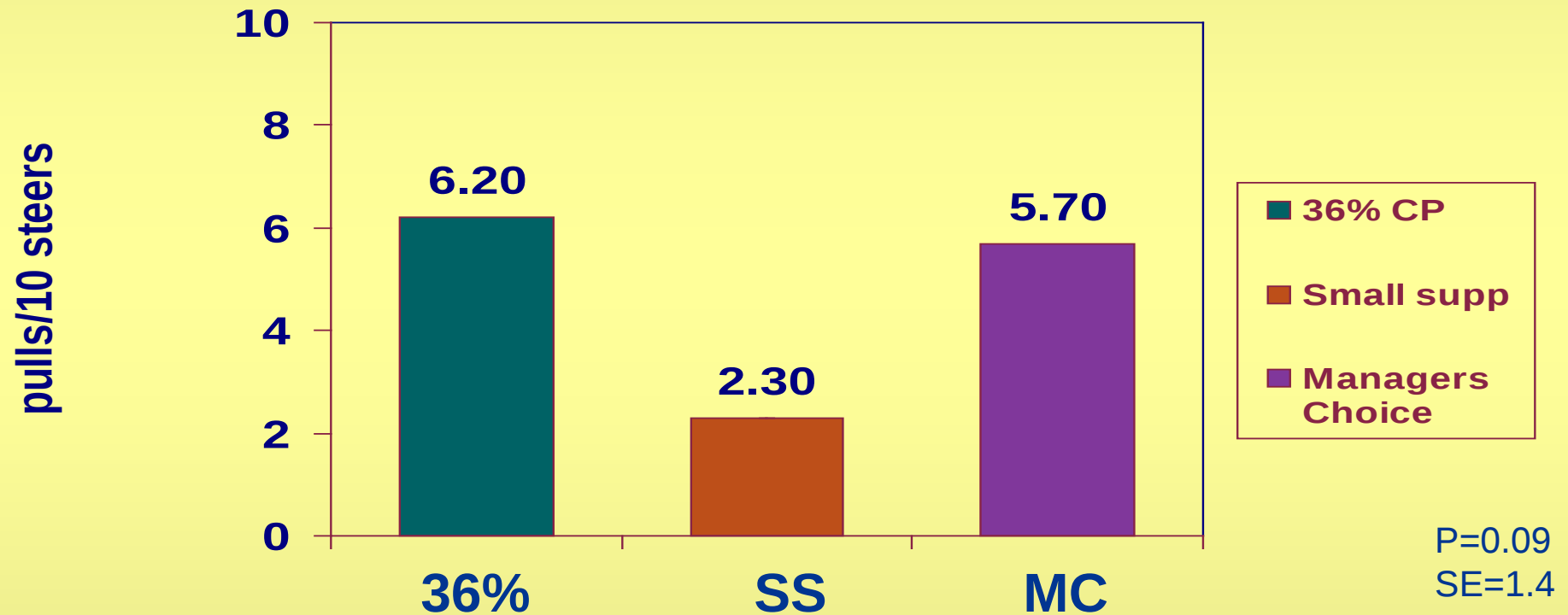
Effect of cow supplement type on calf feedlot cost of gain (Ranch to Rail)

Results (2003, 4 and 5)



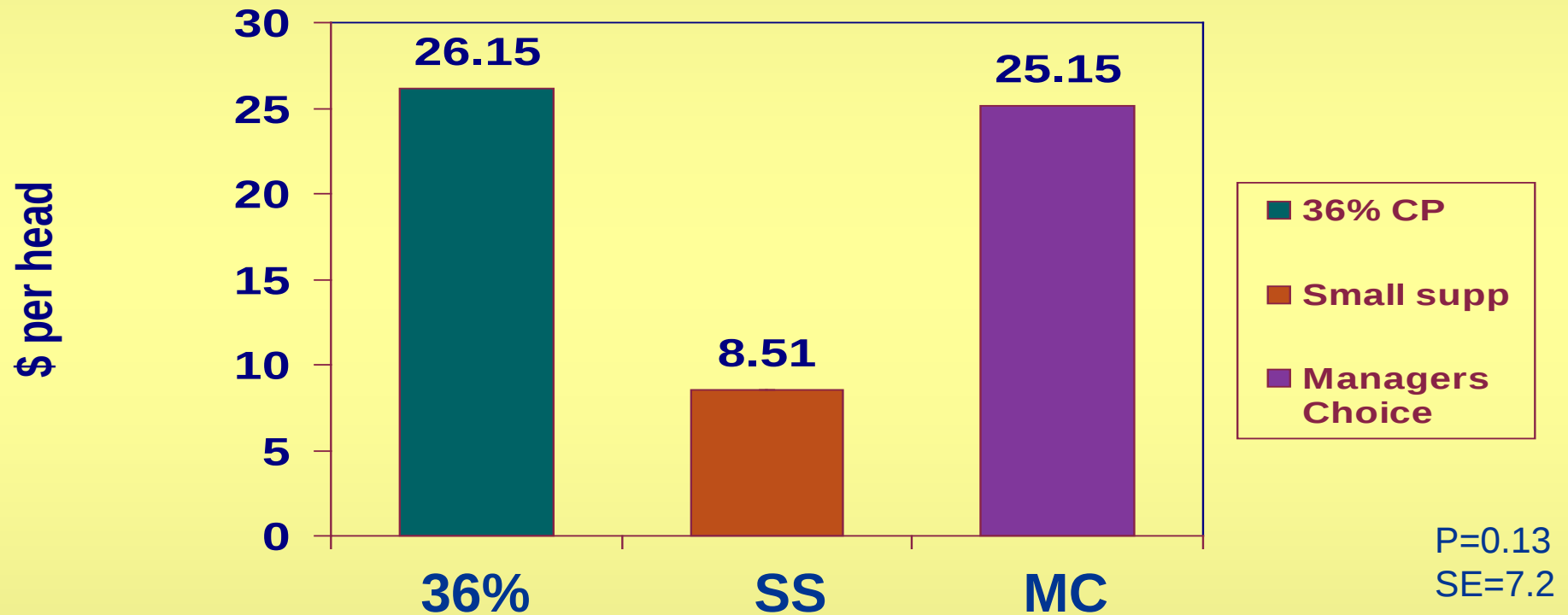
Effect of cow supplement type on calf pulls per 10 steers (Ranch to Rail)

Results (2003, 4 and 5)



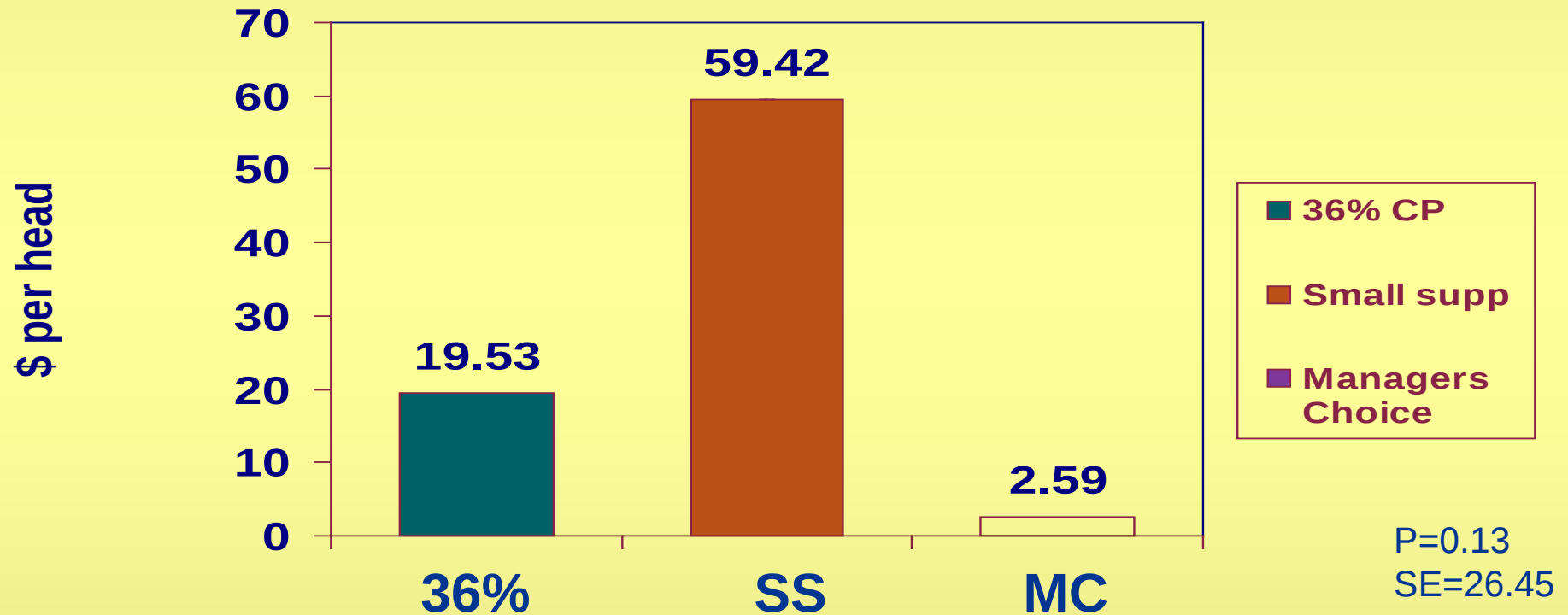
Effect of cow supplement type on calf medicine cost (Ranch to Rail)

Results (2003, 4 and 5)



Effect of cow supplement type on calf feedlot net profit (Ranch to Rail)

Results (2003, 4 and 5)



Interaction between Gestation & Calf Health

- Cow & calf have a well tuned system to coordinate nutrient sharing
- Excessive weight loss will compromise cow and calf
- Stress as a fetus can impact a calf's productivity

