

**Texas Dairy Matters**  
Higher Education Supporting the Industry  
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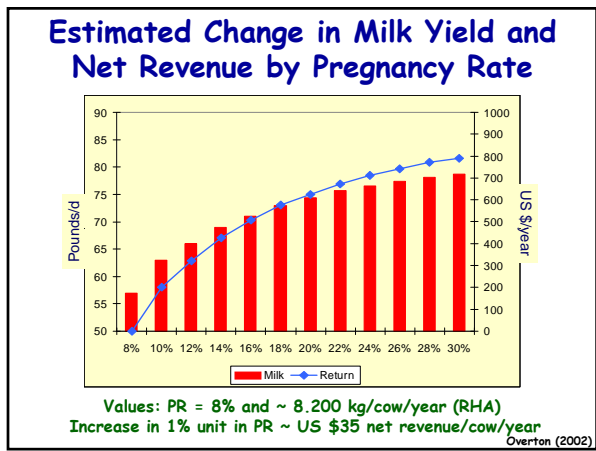
## Considerations for Improving Your Resynchronization Program

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### Impact of Low Fertility on the Cattle Industry's Profitability

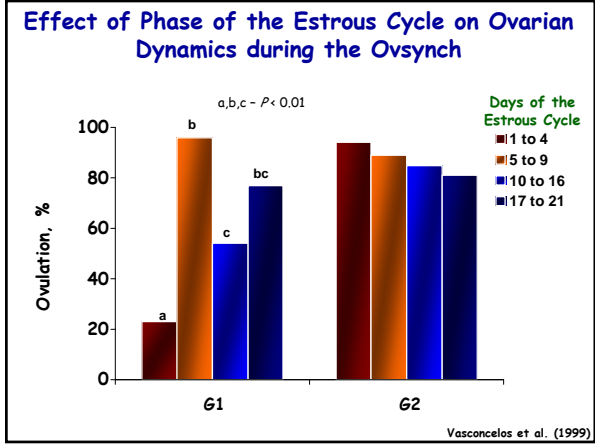
- In 1979, the estimated cost of low fertility for the cattle industry was \$600 million (Gerrits et al., 1979)
  - \$300 million is lost because of poor estrous detection (Senger, 1994)
  - Average value of a new pregnancy is \$278 (De Vries, 2006)
  - Average cost of a lost pregnancy is between \$555 (De Vries, 2006) and \$640 (Thurmond et al., 1990)
- Involuntary culling: reproductive failure is second only to mastitis (NAHMS)

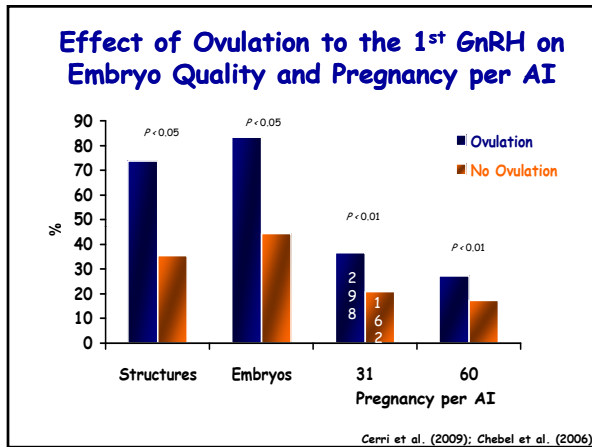
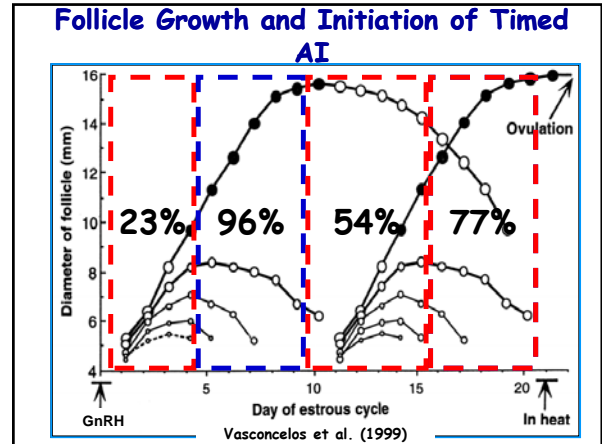
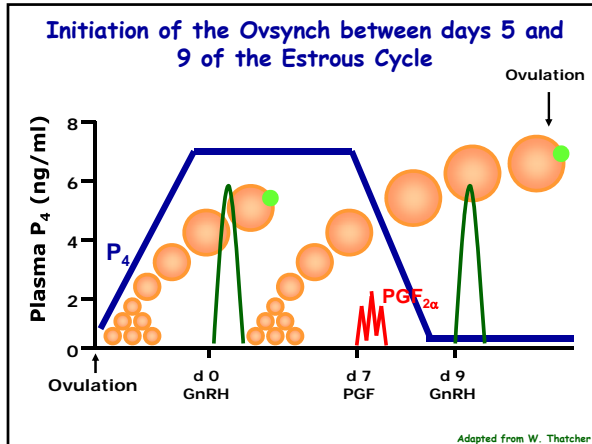


### Why Do We Use Synchronization Protocols?

- Inefficiencies have led to much research in the area of timed artificial insemination (TAI).
  - Ensures all cows get bred by certain day post calving
  - Reduces the need for estrus detection
- Pursley et al. (1995) Ovsynch protocol
- Many changes in synchronization protocols in the past 15 years
- Ability to manipulate cows estrous cycles has drastically improved P/AI for first postpartum TAI

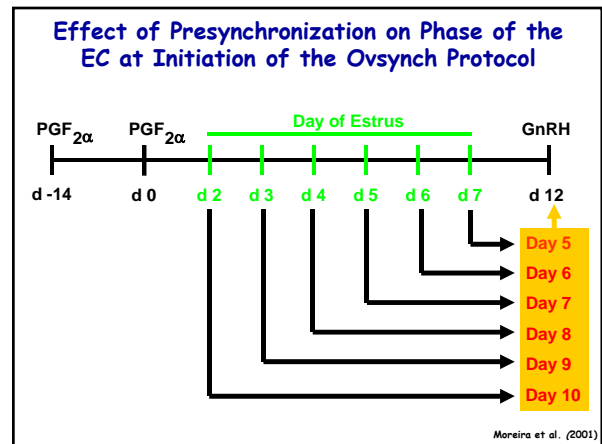
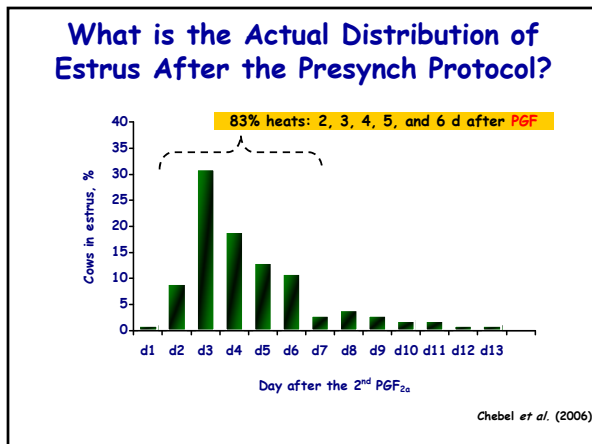
### Why Do We Use Presynchronization Protocols Before Starting OvSynch?

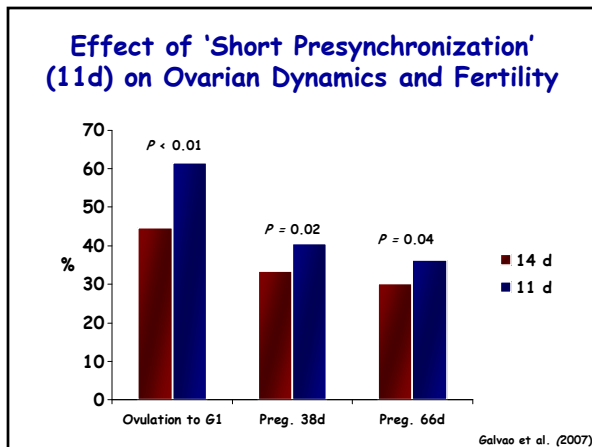
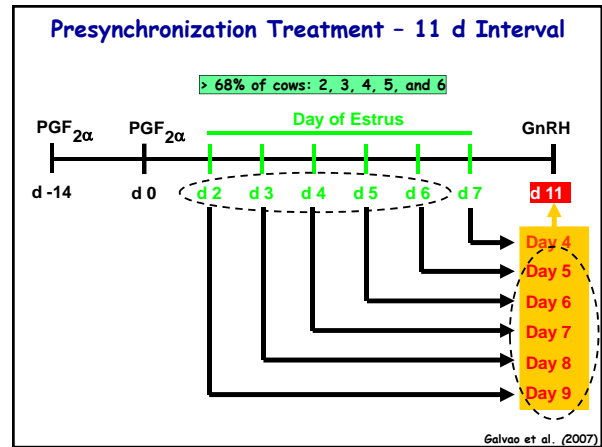
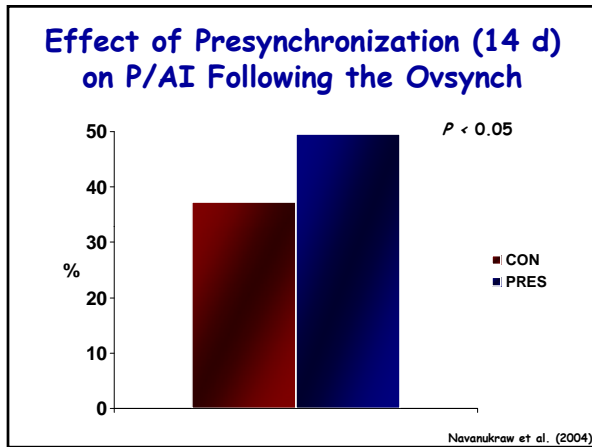
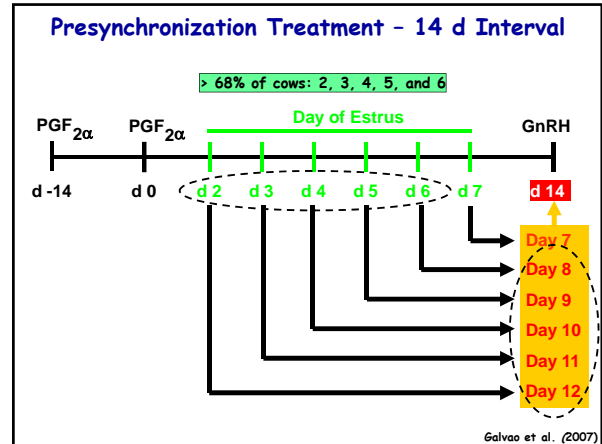
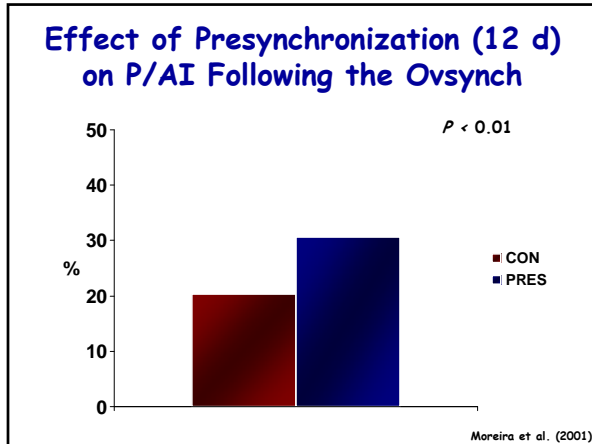




### Development of Presynchronization Protocols

- Start of the Ovsynch during:
  - Meta-estrus: reduced ovulation to G1 and ovulation of aged oocyte;
  - Mid diestrus: reduced ovulation to G1 and spontaneous luteolysis, asynchronous ovulation;
  - Late diestrus: occurrence of spontaneous luteolysis and ovulation prior to G2 and AI;
- Treatment of cows with two PGF, 14 d apart, and start of the Ovsynch 12 d later, would result in cows starting the Ovsynch during early diestrus (d 5-10)



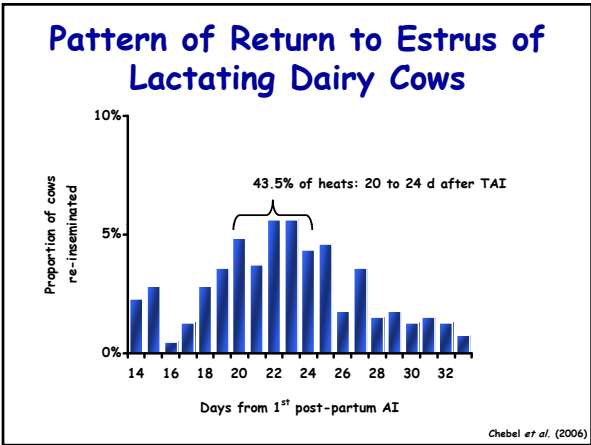


- ### Summary for Presynchronization
- Presynchronization improves fertility to first TAI
    - Puts cows between d 5 - d 9 of the estrous cycle - Optimal
    - Improves ovulation to first GnRH of Ovsynch
    - Better quality embryos
    - Improved Fertility
  - Presynchronization with two PGF, 14 d apart, and start Ovsynch between 10 - 12 d later, would result in cows starting the Ovsynch during early diestrus (d 5-10)

## ...But What About Resynch?

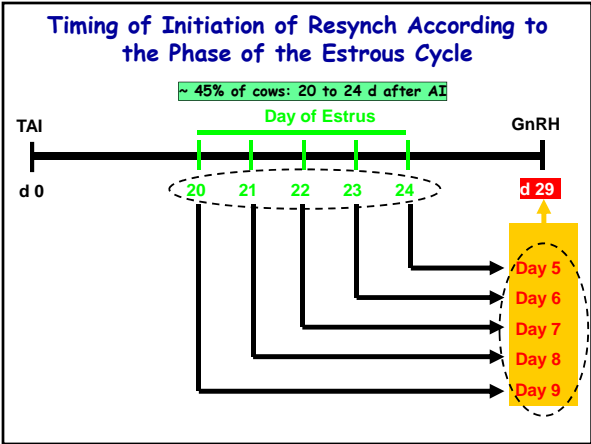
### The Need for Timely Re-Insemination of Lactating Dairy Cows

- Only ~ 35-45% of cows are pregnant after 1<sup>st</sup> AI
- 21 d heat detection rate is often < 50%, if no timed AI used
  - 100 open cows
    - 50 re-inseminated within 21 d
    - 25 re-inseminated within 42 d
    - 13 re-inseminated within 63 d ...
  - 12% of open cows not re-inseminated by 63 d after AI
- Use of timed AI allows for 100% re-insemination within 3 to 23 d after non-pregnancy diagnosis
  - Most resynchronization timed AI protocols result in significantly lower fertility than either first AI or re-insemination on estrus

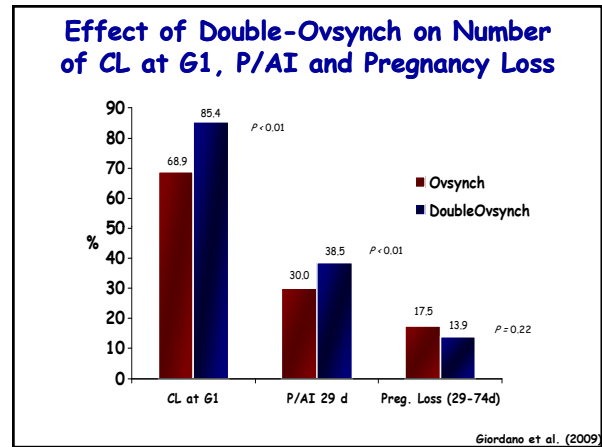
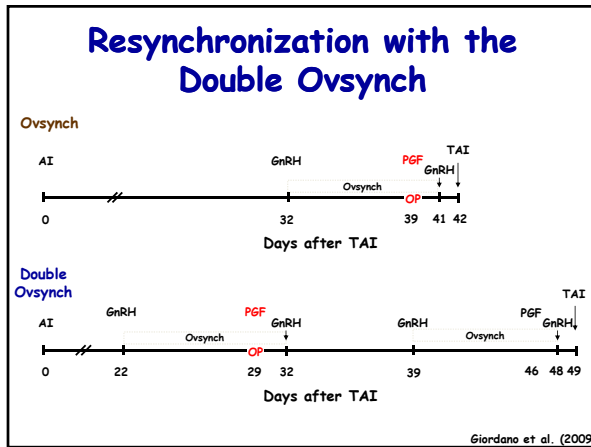
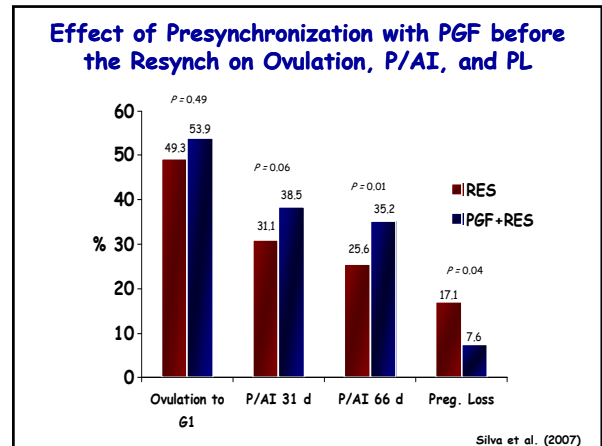
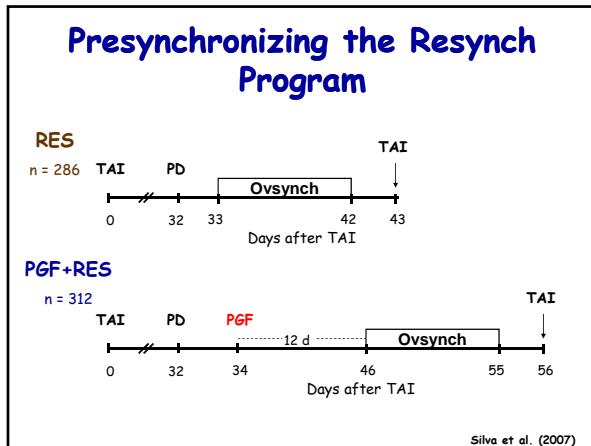


### Factors Affecting the Pattern of Return to Estrus

- Synchronization after Presynch-Ovsynch = 85% (Bruno et al., 2009)
- Cows truly in estrus when AI based on 'observed estrus' ~ 90-95% (Moore et al., 2005; Dalton unpublished)
- Short luteal phase following first AI = 15-18% (Cerri et al., 2008; Denicol et al., 2009)
  - Overall, we can expect up to 30% of cows not having the expected return to estrus
- Proportion of viable embryos at 6 d after AI = 58% (Santos et al., 2004)
- Pregnancy rates at 28 d after AI = 40% (Stevenson et al., 2006; Santos et al., 2004)
  - Embryonic wastage before 28 d = 31%
  - Potential for another 18% of cows to have altered return to estrus
- Not surprising if up to 45% of cows have abnormal return to estrus (< 20 or > 24 d)



## Presynch Your Resynch?



- ## Conclusions
- Relying solely on interval from previous AI may not result in adequate stage of the estrous cycle at first GnRH injection
    - Lack of synchronization before the start of resynchronization appears to reduce fertility
      - Treatment with PGF before start of resynchronization or Double-Ovsynch improved P/AI
      - Double-Ovsynch required ultrasound
      - Both treatments increased interval to AI in 12 and 7 d, respectively

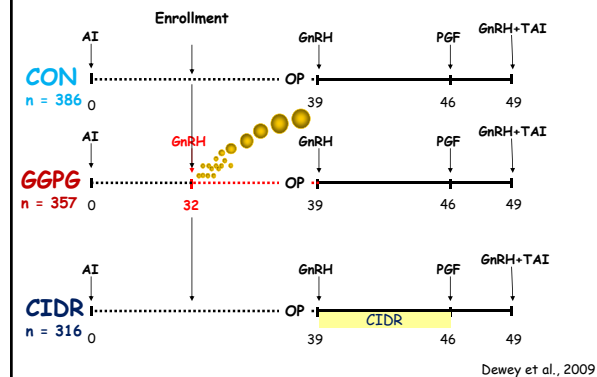
## Recent Research on Resynchronization of Lactating Dairy Cows

## Study Design

- Two commercial dairies, one in CA (free stall) and one in AZ (dry lot)
- Cows eligible to be enrolled one week before pregnancy diagnosis ( $32 \pm 3$  DSLH)
- Blood samples and ultrasound at GnRH and PGF ( $n = 130/\text{treatment}$ )
- Pregnancy exams at  $39 \pm 3$  d after AI in both sites and reconfirmation at  $60 \pm 3$  or  $120 \pm 3$  DSLH in CA and AZ, respectively

Dewey et al., 2009

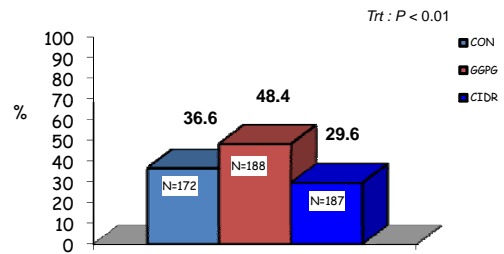
## Resynchronization Protocols



## Effect of Treatment on Pattern of Re-insemination of Lactating Dairy Cows

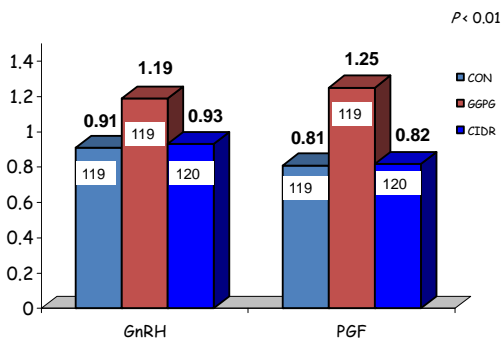
Items	Treatment			P - value
	Control	GGPG	CIDR	
Proportion of cows re-inseminated before pregnancy diagnosis	22.1 <sup>a</sup> (384)	14.7 <sup>b</sup> (315)	29.6 <sup>c</sup> (318)	< 0.01
Pregnancy rate at palpation	68.7 <sup>a</sup>	68.4 <sup>a</sup>	73.3 <sup>b</sup>	0.01
Proportion of cows re-inseminated from non-pregnancy diagnosis to PGF <sub>2a</sub>	12.8 <sup>a</sup>	7.6 <sup>b</sup>	0.45 <sup>c</sup>	< 0.01
Proportion of cows re-inseminated from enrollment to PGF <sub>2a</sub>	32.3 <sup>a</sup>	22.6 <sup>b</sup>	29.9 <sup>c</sup>	< 0.01

## Effect of Resynchronization Protocol Percent of Cows Ovulated to First GnRH



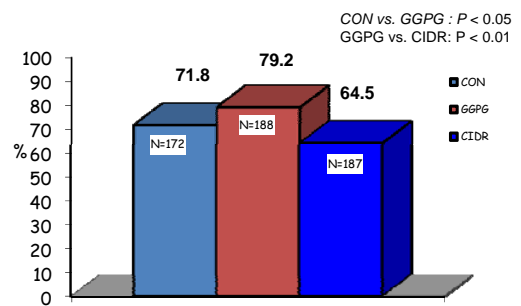
Dewey et al., 2009 abst

## Effect of Resynchronization Protocol Number of CL

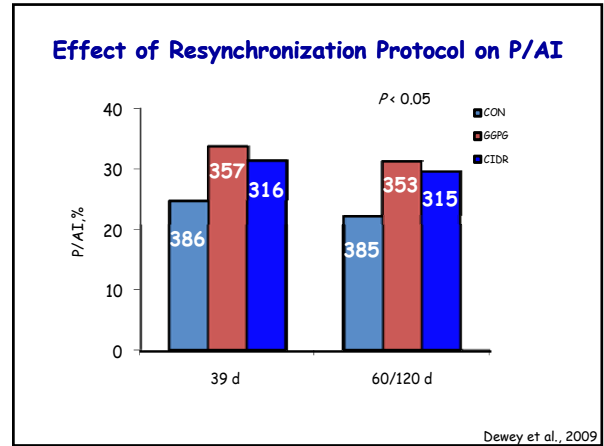
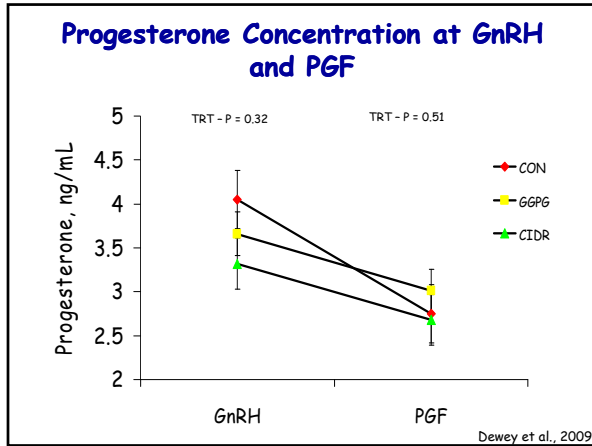


Dewey et al., 2009 abst

## Effect of Resynchronization Protocol Percent of Cows with Progesterone > 1 ng/ml

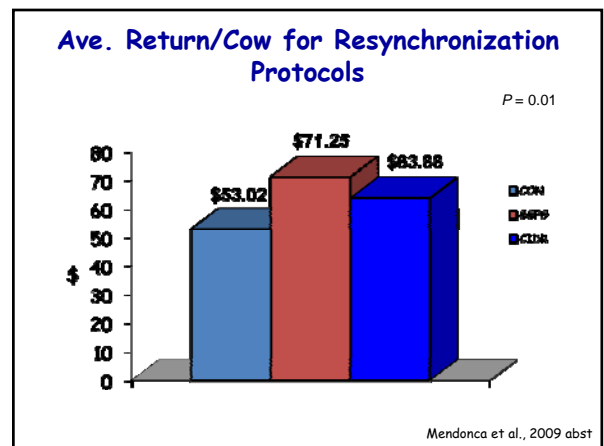
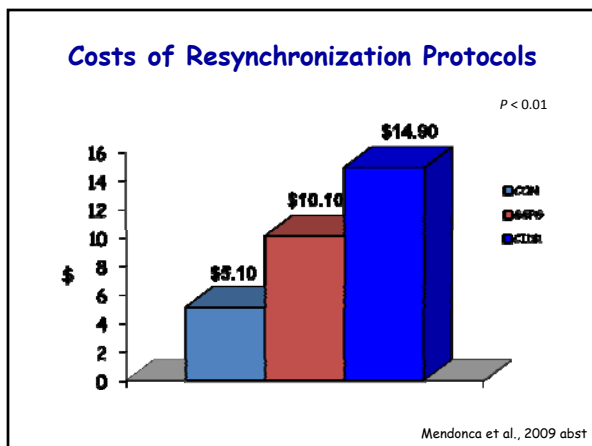


Dewey et al., 2009 abst



- ## Summary
- Injection of GnRH one week before pregnancy diagnosis
    - Increased number of CL at GnRH and PGF of Resynch
    - Increased proportion of cows with P4 > 1.0 ng/mL at first GnRH of Resynch
    - Increased ovulation to first GnRH
  - GGPG and CIDR protocols avoided significant drop in P4 from GnRH to PGF of Resynch
  - GGPG and CIDR protocols improved P/AI at 39 and 66/120 d after AI

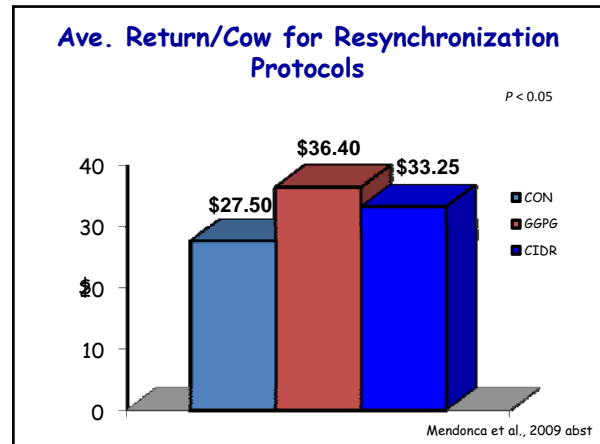
## Economics of Resynchronization Protocols



### 81 Scenarios Were Used to Evaluate Resynchronization Protocols

- Pregnancy Value - \$100 to 500 (\$50 increments)
- PGF - \$1.50
- GnRH - \$1 to \$5 (\$0.5 increments)
- CIDR - \$5 to \$15 (\$2.5 increments)
- Labor for injections - \$10/hr
- Pregnancy rate at palpation - 20% to 70% (5% increments)

Mendonca et al., 2009



### Economic Analysis of Resynchronization Protocols for Lactating Dairy Cows

Items (\$)	Treatment			P- value
	Control	GGPG	CIDR	
Resynchronization protocol cost for resynchronized cows	5.40 ± 0.0 <sup>a</sup>	10.66 ± 0.0 <sup>b</sup>	14.85 ± 0.0 <sup>c</sup>	< 0.01
Pregnancy value	60.93 ± 6.98 <sup>a</sup>	85.86 ± 7.06 <sup>b</sup>	75.99 ± 7.53 <sup>b</sup>	0.04
Return per cow	55.04 ± 6.98	73.29 ± 7.07	60.64 ± 7.53	0.05
Return per cow according to 81 different scenarios	27.50 ± 0.08 <sup>a</sup>	36.40 ± 0.08 <sup>b</sup>	33.25 ± 0.08 <sup>c</sup>	< 0.01

## Summary

- Economic data favored both GGPG and CIDR compared to Control
- GGPG had a greater return per cow both within the experiment and when taking into account the 81 different scenarios compared to both CIDR and Control

## Conclusion

- Presynchronization improves TAI fertility with both first TAI and with a Resynch program
- GGPG and CIDR improved fertility compared to Control cows
- GGPG allows for improved fertility and return on investment without the increase in DOPN
- Further Studies are warranted to assess if using a CIDR within the GGPG program would produce added benefits with a significant return on investments

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## Thank You!

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