

# **Estrus Synchronization for Beef Cattle**

**Cliff Lamb**

***State Beef Specialist  
University of Minnesota***

# Estrous Synchronization Protocols

Hybrid Synch

MGA/PGF

Two shot PGF

7-11 Synch

Select Synch

MGA Select

Hybrid Synch+CIDR

Ov-synch

Presynch

Resynch

CIDR/PGF

One shot PGF

CO-synch

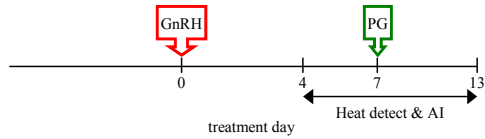
CO-synch+CIDR

Heat Synch

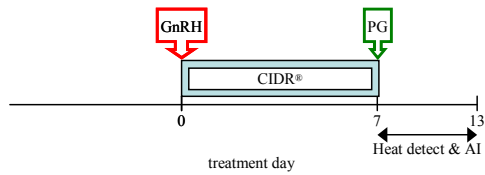
# BEEF COW PROTOCOLS

## HEAT DETECTION

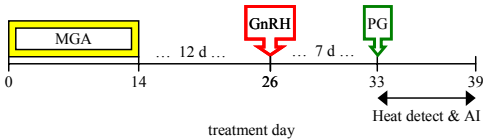
### Select Synch



### Select Synch + CIDR®

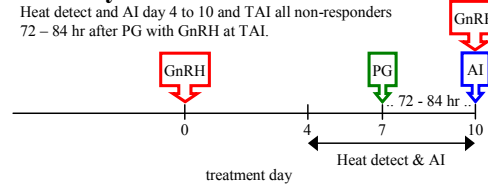


### MGA® Select

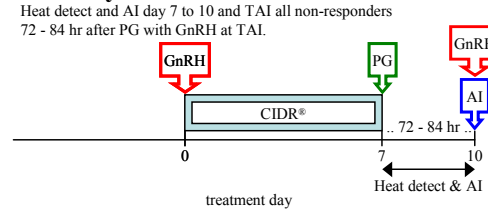


## HEAT DETECT & TIME AI (TAI)

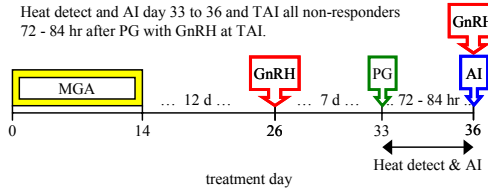
### Select Synch & TAI



### Select Synch + CIDR® & TAI



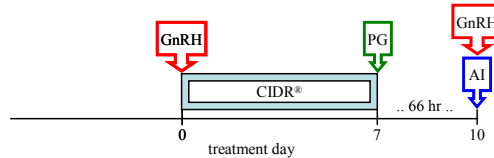
### MGA® Select & TAI



## FIXED-TIME AI (TAI)

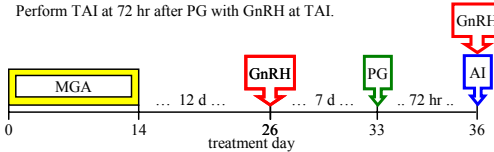
### CO-Synch + CIDR®

Perform TAI at 66 hr after PG with GnRH at TAI.



### MGA® Select

Perform TAI at 72 hr after PG with GnRH at TAI.



## COMPARISON OF PROTOCOLS FOR BEEF COWS

HEAT DETECTION	COST	LABOR
Select Synch	Low	Medium/High
Select Synch + CIDR®	High	Medium
MGA® Select	Medium	Medium/High

### HEAT DETECT & TAI

Select Synch (TAI non-responders 72-84 hr after PG)	Low	Medium/High
Select Synch + CIDR® (TAI non-responders 72-84 hr after PG)	High	Medium
MGA® Select (TAI non-responders 72-84 hr after PG)	Medium	Medium/High

### FIXED-TIME AI (TAI)

CO-Synch + CIDR® (TAI at 66 hr after PG with GnRH at TAI)	High	Medium
MGA® Select (TAI at 72 hr after PG with GnRH at TAI)	Medium	High

• The times listed for "Fixed-time AI" should be considered as the approximate average time of insemination. This should be based on the number of cows to inseminate, labor, and facilities.

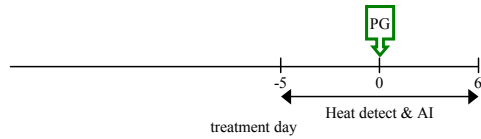
GnRH Cystorelin®, Factrel®, Fertagyl®, OvaCyst®

PG Estrumate®, In-Synch®, Lutalyse®, ProstaMate®

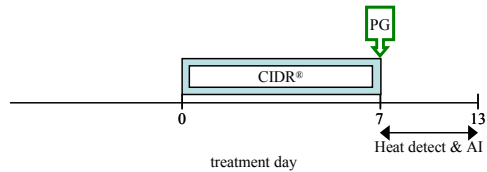
# BEEF HEIFER PROTOCOLS

## HEAT DETECTION

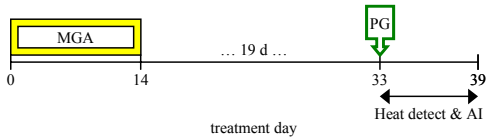
### 1 Shot PG



### CIDR®-PG



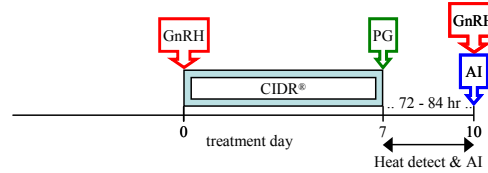
### MGA®-PG



## HEAT DETECT & TIME AI (TAI)

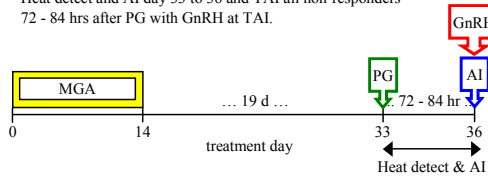
### Select Synch + CIDR® & TAI

Heat detect and AI day 7 to 10 and TAI all non-responders 72 - 84 hr after PG with GnRH at TAI.



### MGA®-PG & TAI

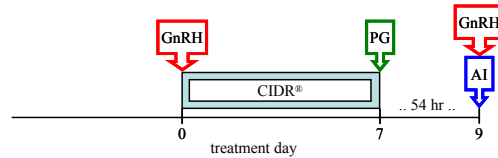
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## FIXED-TIME AI (TAI)

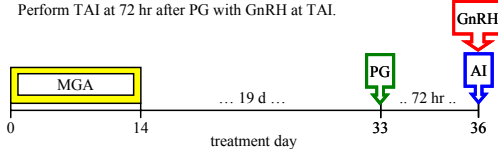
### CO-Synch + CIDR®

Perform TAI at 54 hr after PG with GnRH at TAI.



### MGA®-PG

Perform TAI at 72 hr after PG with GnRH at TAI.



### COMPARISON OF PROTOCOLS FOR BEEF HEIFERS

HEAT DETECTION	COST	LABOR
1 Shot PG	Low	High
CIDR®-PG	Medium	Medium
MGA®-PG	Low	Low/Medium

### HEAT DETECT & TAI

Select Synch + CIDR® (TAI non-responders 72-84 hr after PG)	High	Medium
MGA®-PG (TAI non-responders 72-84 hr after PG)	Medium	Medium

### FIXED-TIME AI (TAI)

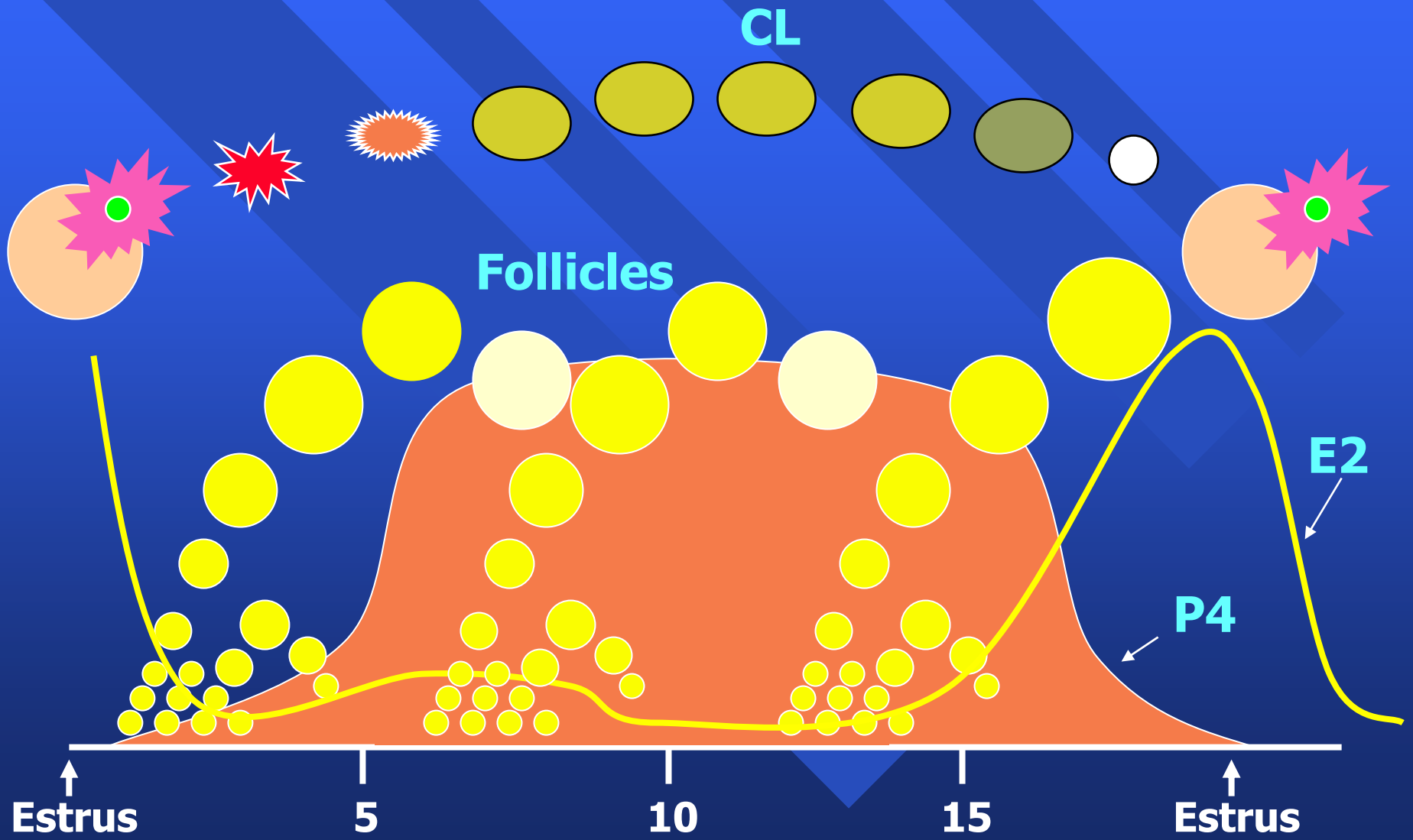
CO-Synch + CIDR® (TAI at 54 hr after PG with GnRH at TAI)	High	Medium
MGA®-PG (TAI at 72 hr after PG with GnRH at TAI)	Medium	Medium

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GnRH Cystorelin®, Factrel®, Fertagyl®, OvaCyst®

PG Estrumate®, In-Synch®, Lutalyse®, ProstaMate®

# THE ESTROUS CYCLE



# Synchronization Products

## ☞ Prostaglandin (PGF)

Lutalyse<sup>®</sup>

Prostamate<sup>®</sup>

In-Synch<sup>®</sup>

Estrumate<sup>®</sup>



**Corpus Luteum**



**Progesterone**

**Follicle**

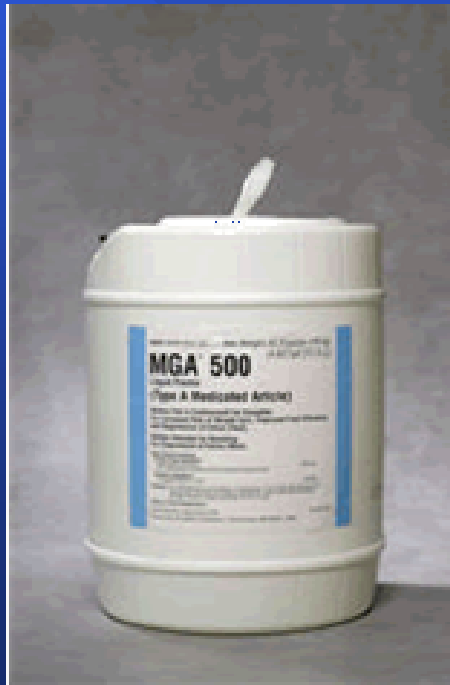
**Ovulation**



# Synchronization Products

## ☞ Progestins

Melengestrol Acetate (MGA)  
CIDR





**Corpus Luteum**



**Progesterone**

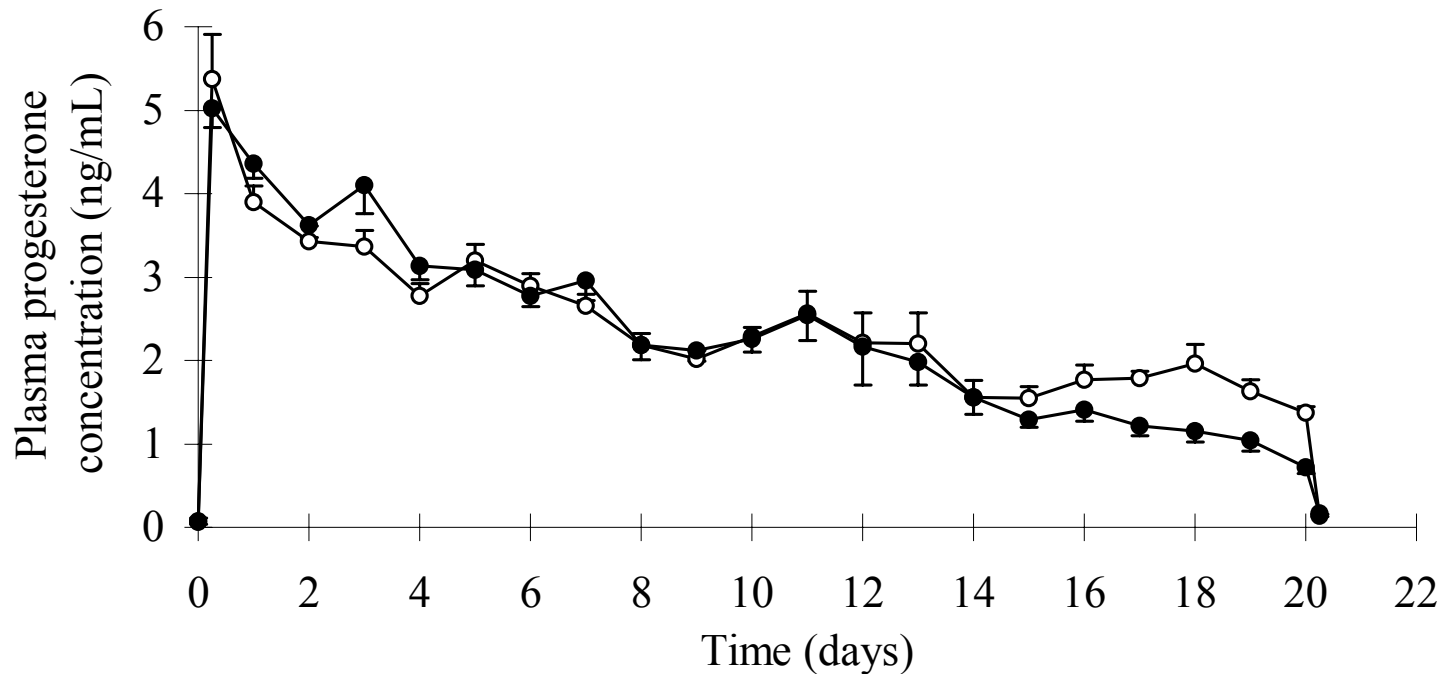
**Follicle**



**Ovulation**



# Concentrations of Progesterone in Ovariectomised Cows Produced by CIDR Containing 1.9g and 1.38g Progesterone Over a 20 Day Treatment



(○ = CIDR<sup>®</sup>1900 Cattle insert, ● = CIDR<sup>®</sup>1380 Cattle insert, N = 10, error bars = SEM)

# Synchronization Products

## ☞ Gonadotropin Releasing Hormone (GnRH)

**Cystorelin<sup>®</sup>**

**Factrel<sup>®</sup>**

**Fertagyl<sup>®</sup>**

**Ova-Cyst<sup>®</sup>**





**Corpus Luteum**



**Progesterone**

**Follicle**



**Ovulation**



# Definitions

## ☞ Synchronization Rate:

% of females detected in estrus compared to total number synchronized.

## ☞ Conception Rate:

% of females pregnant compared to number of females inseminated.

## ☞ Pregnancy Rate:

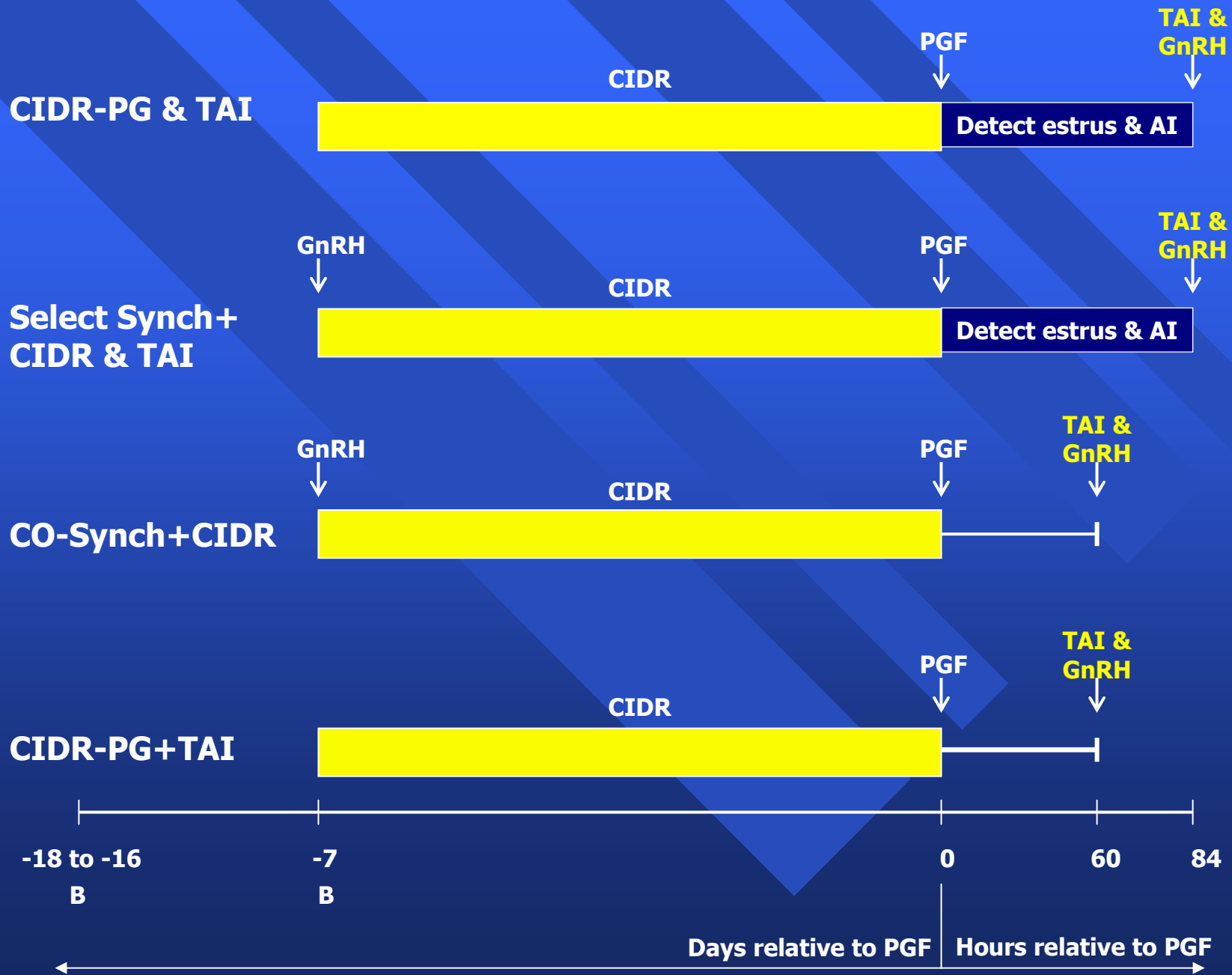
% of females pregnant compared to total number synchronized.

# CIDR Based Protocols

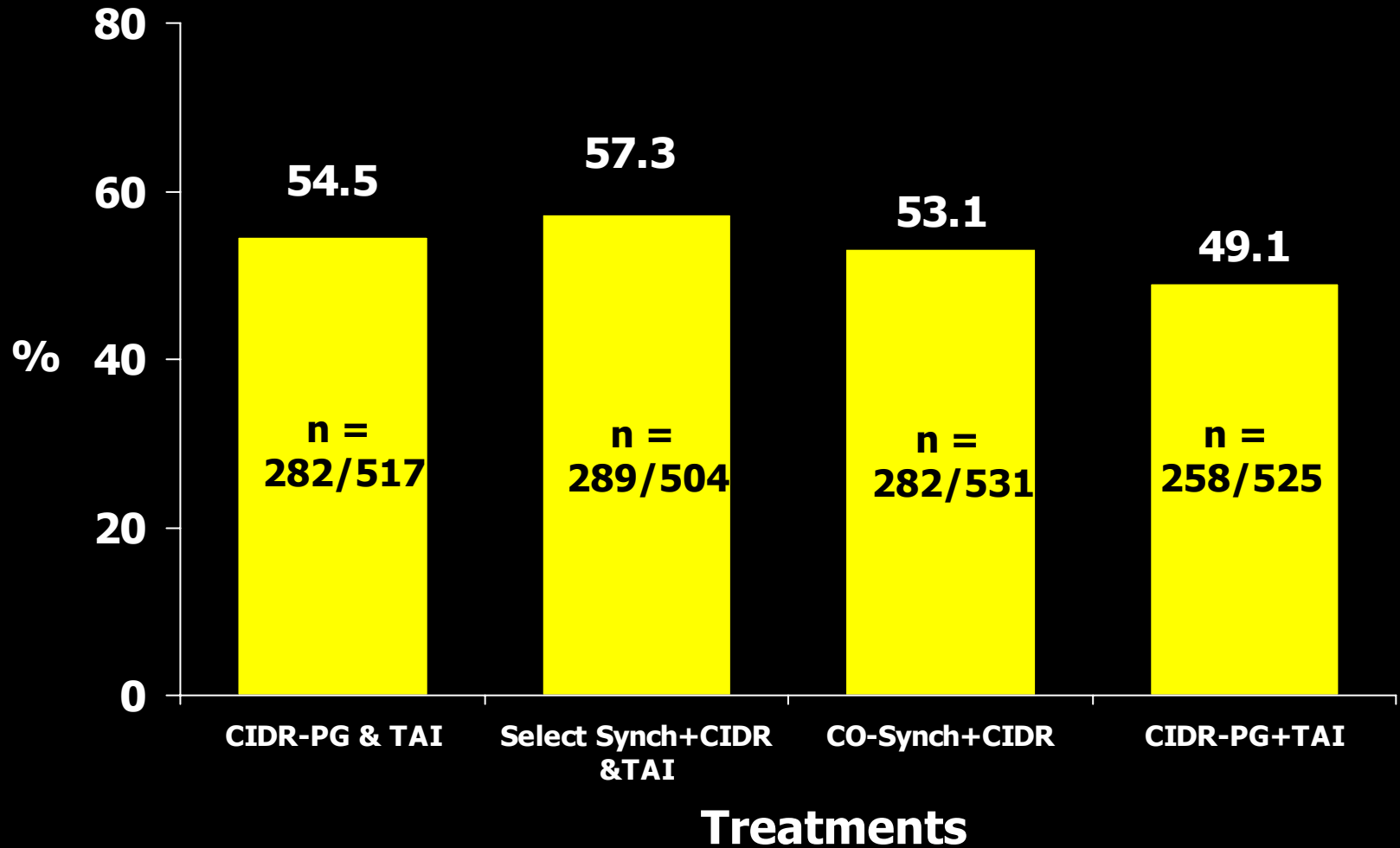


# CIDR Protocols in Heifers

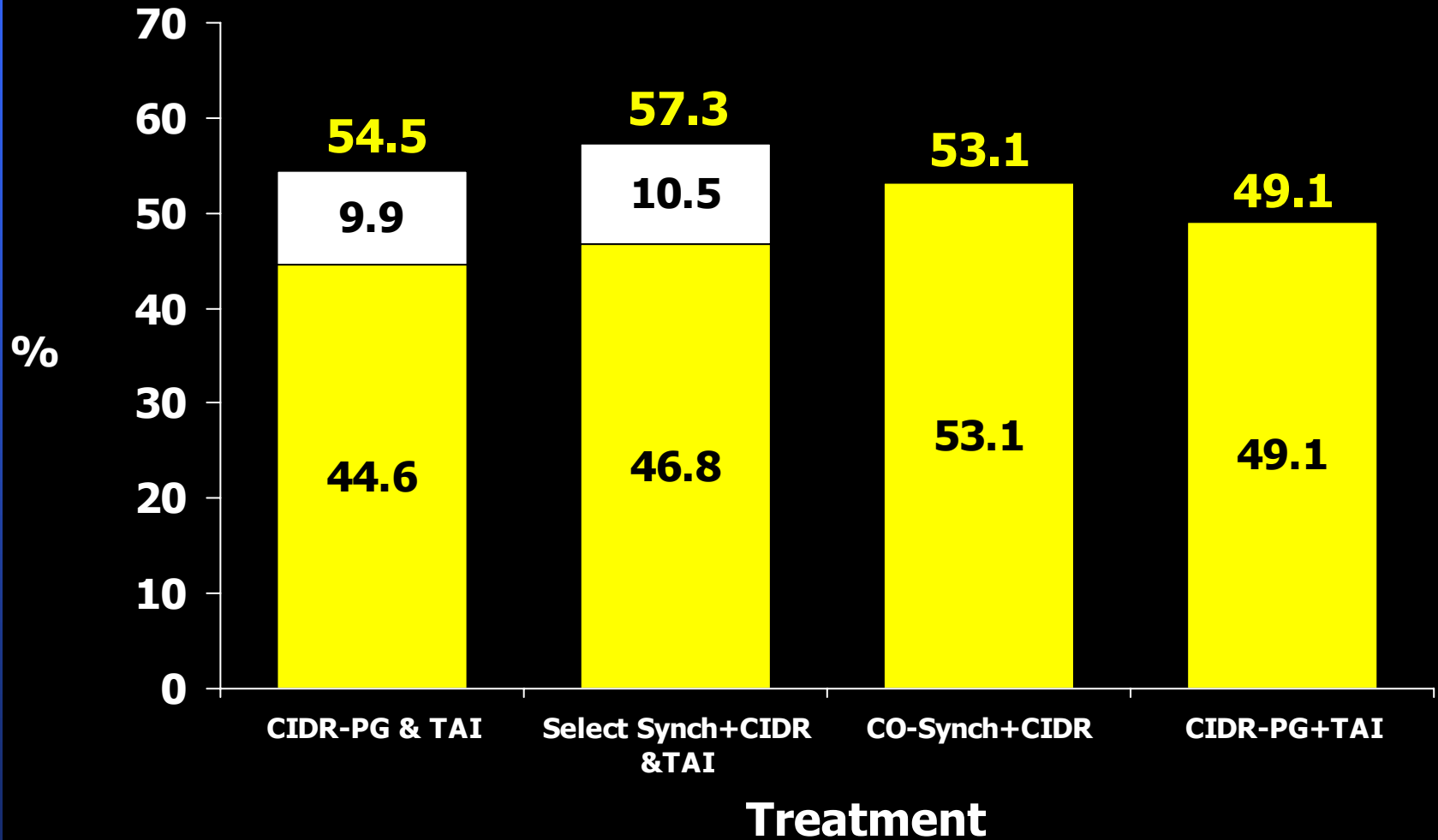




# First Service Pregnancy Rates



# Pregnancy Rates after Estrus Detection Alone vs TAI



**P = 0.221**

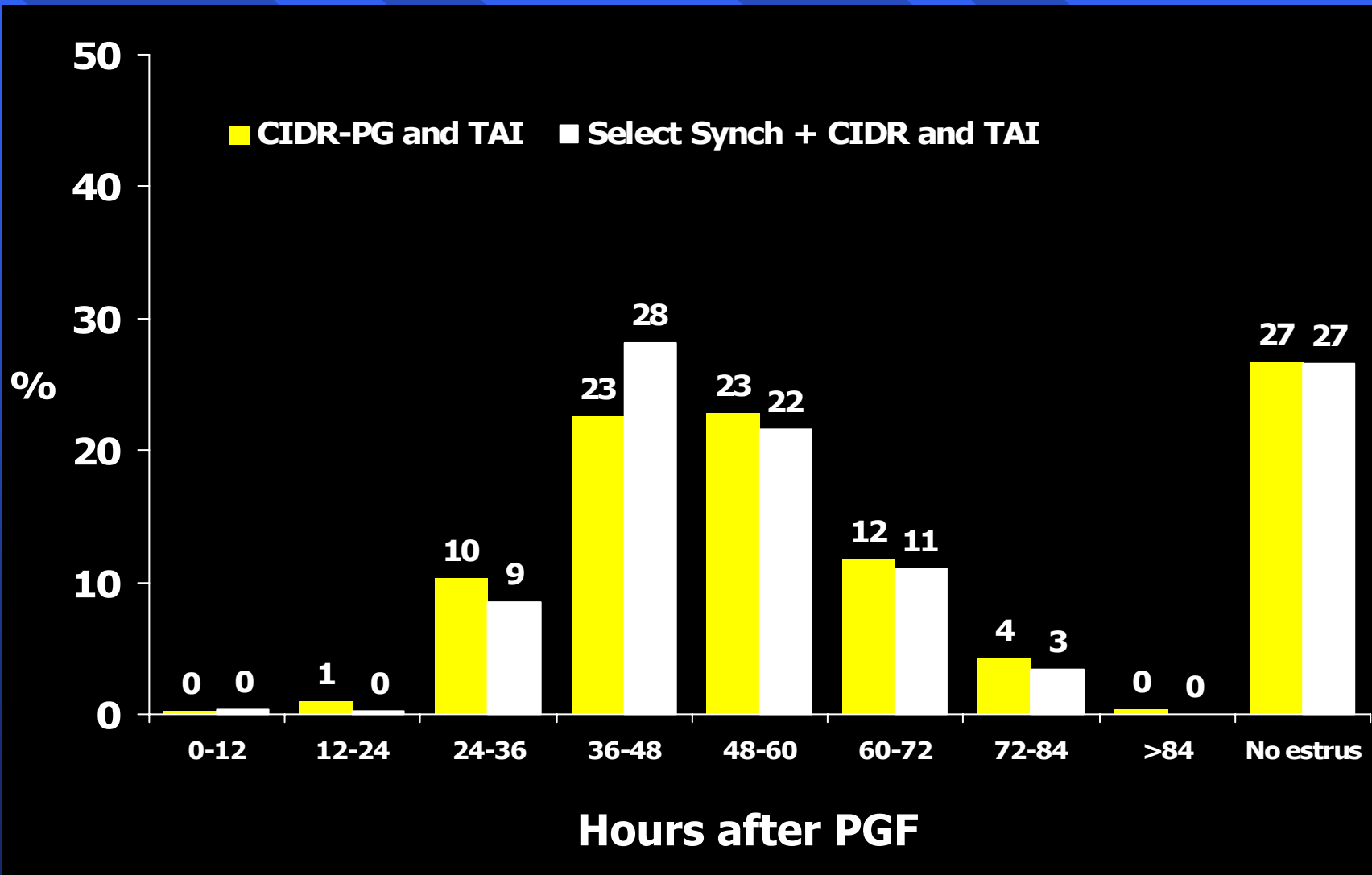
# CIDR-PG & TAI



# Select Synch+ CIDR & TAI

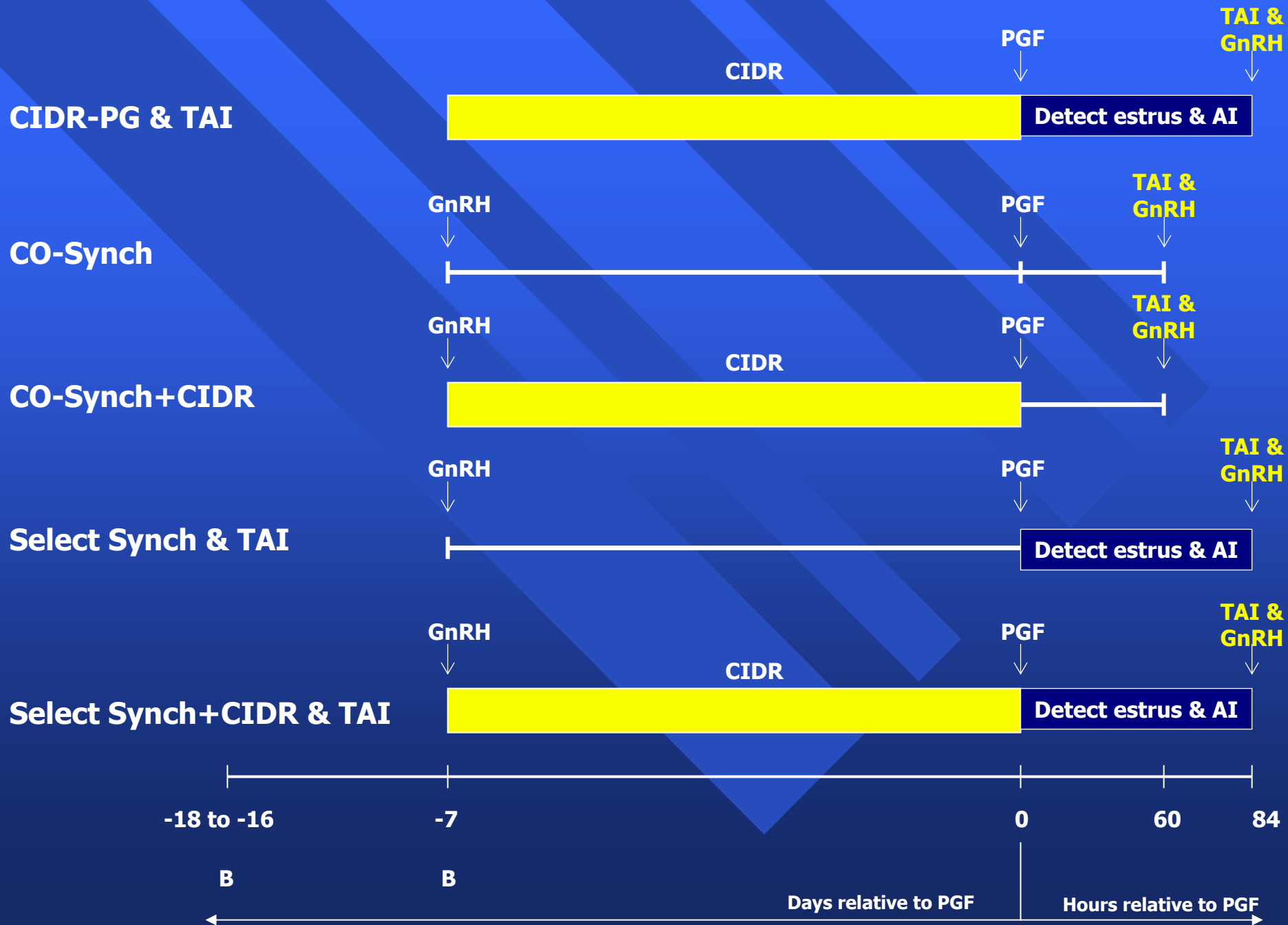


# Distribution of estrus as a percentage of all heifers treated

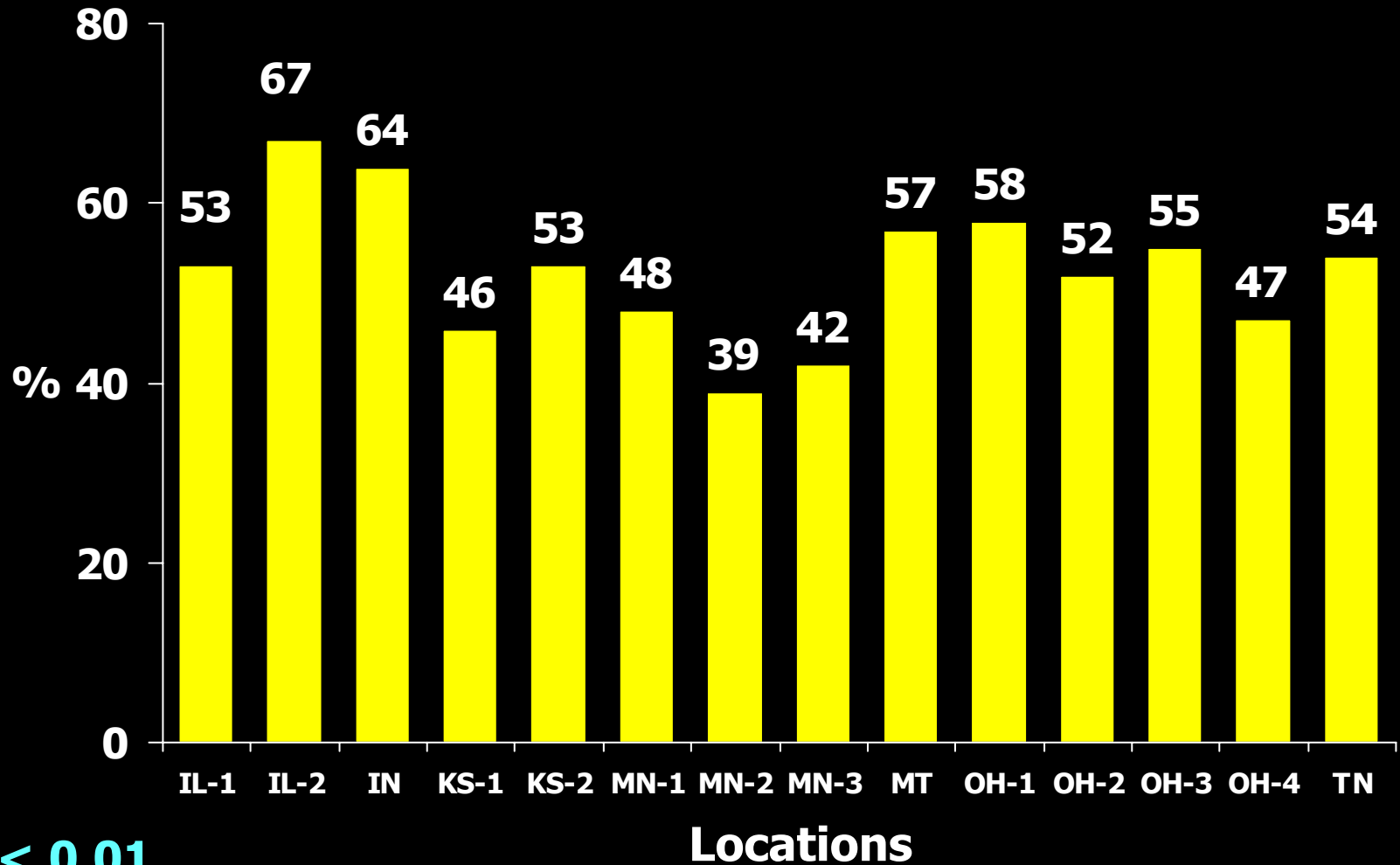


# CIDR Protocols in Cows



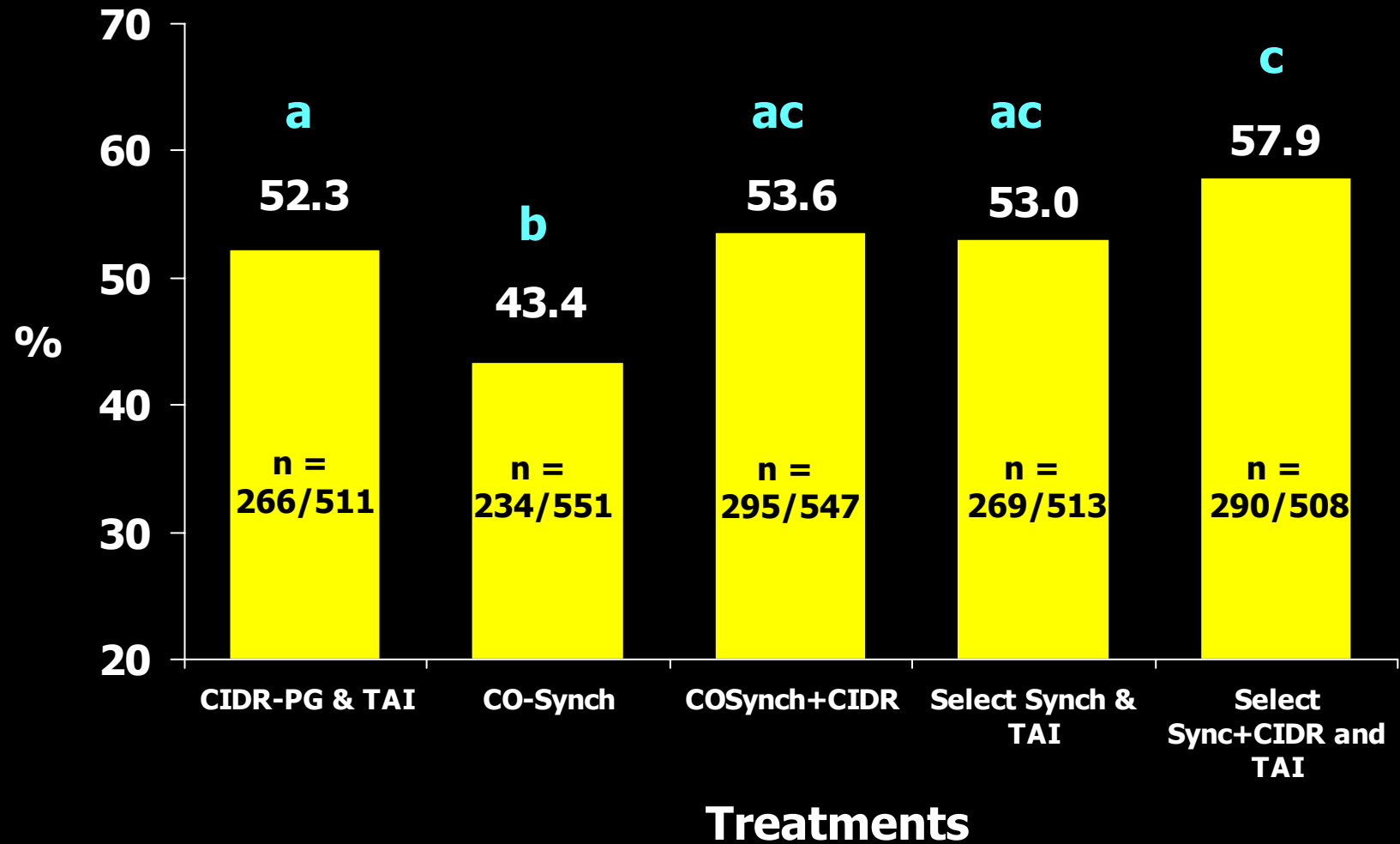


# Effect of Location on Pregnancy Rates



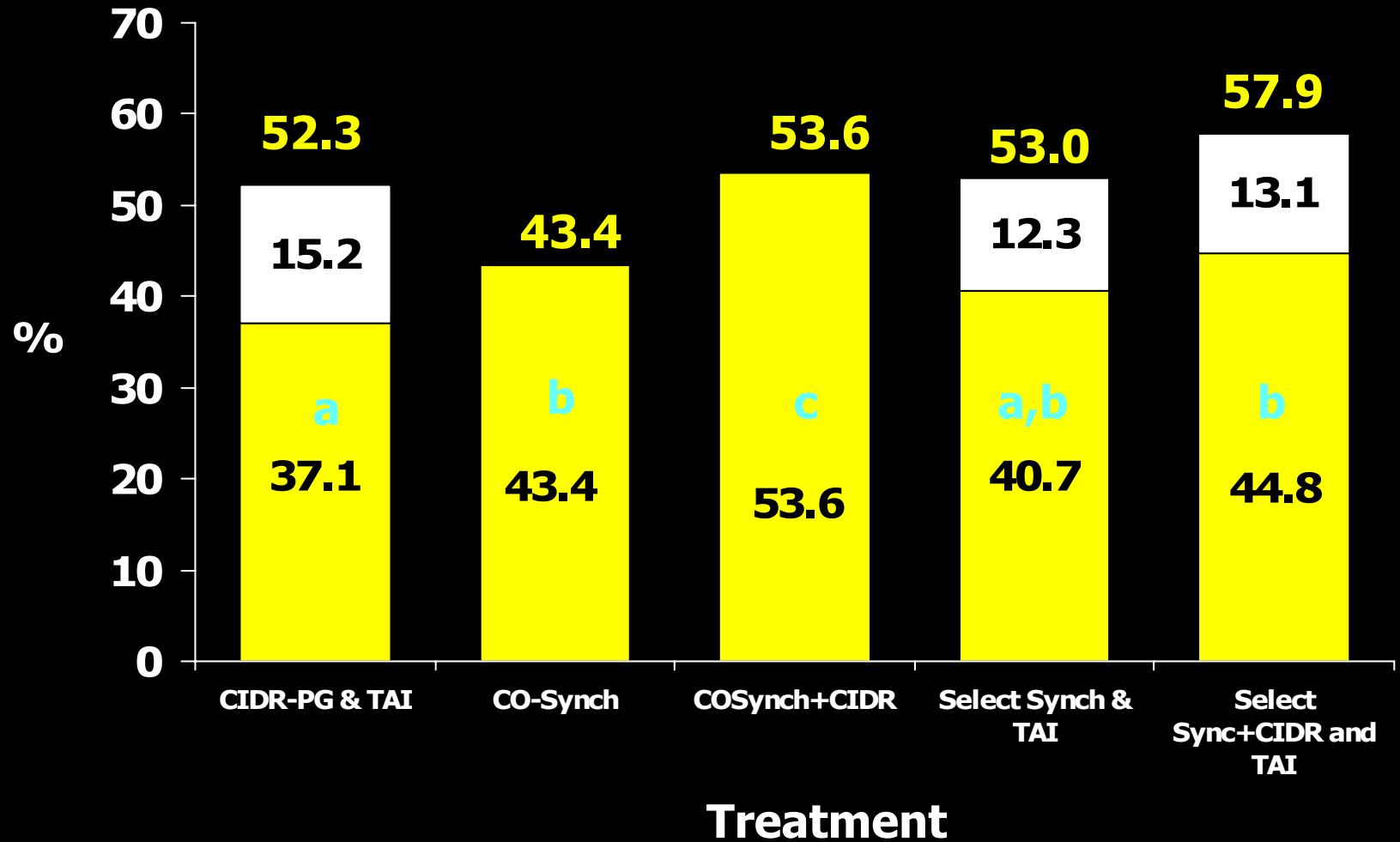
**P < 0.01**

# First Service Pregnancy Rates



**P < 0.05**

# Pregnancy Rates after Estrus Detection Alone vs TAI

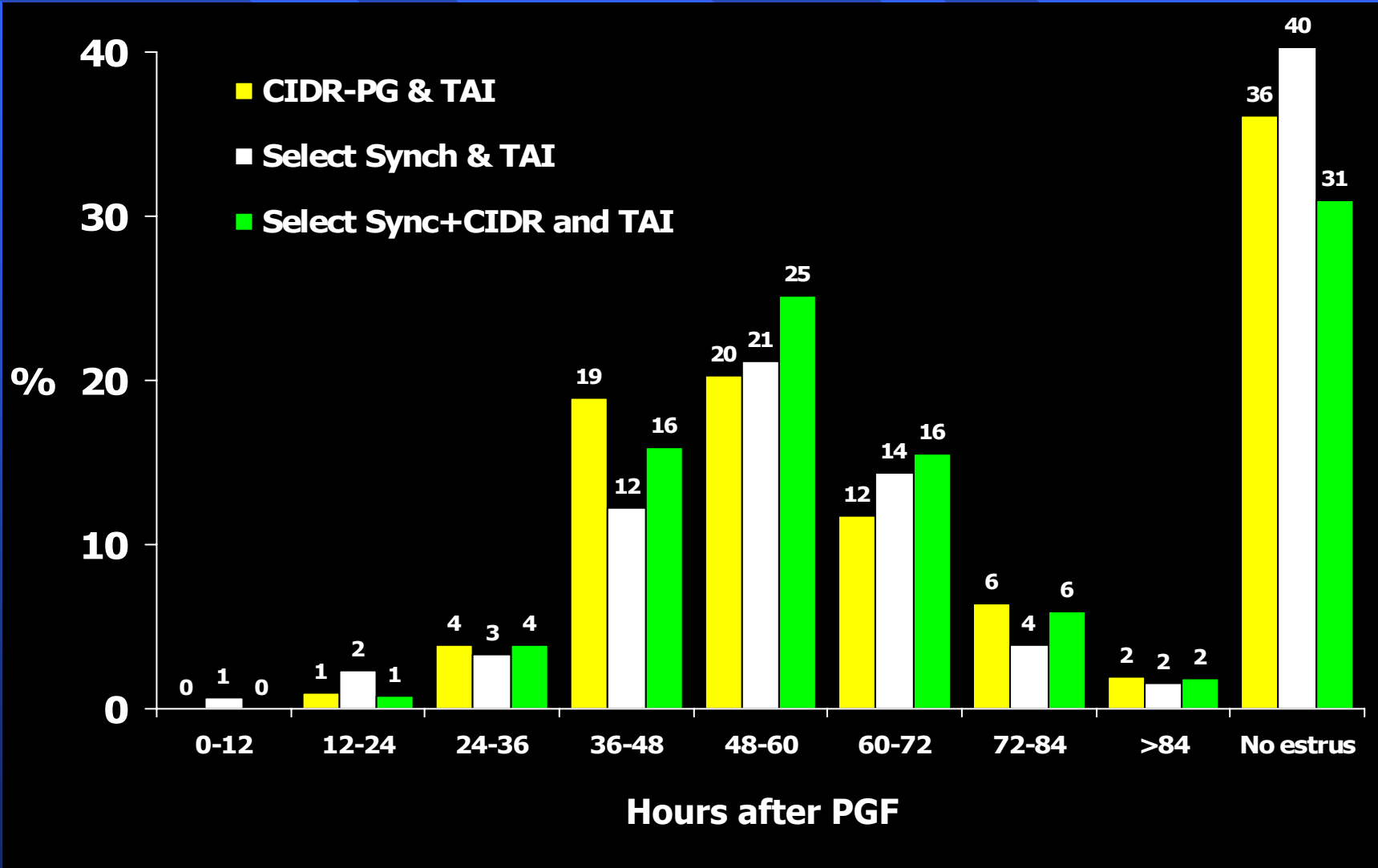


**P < 0.05**

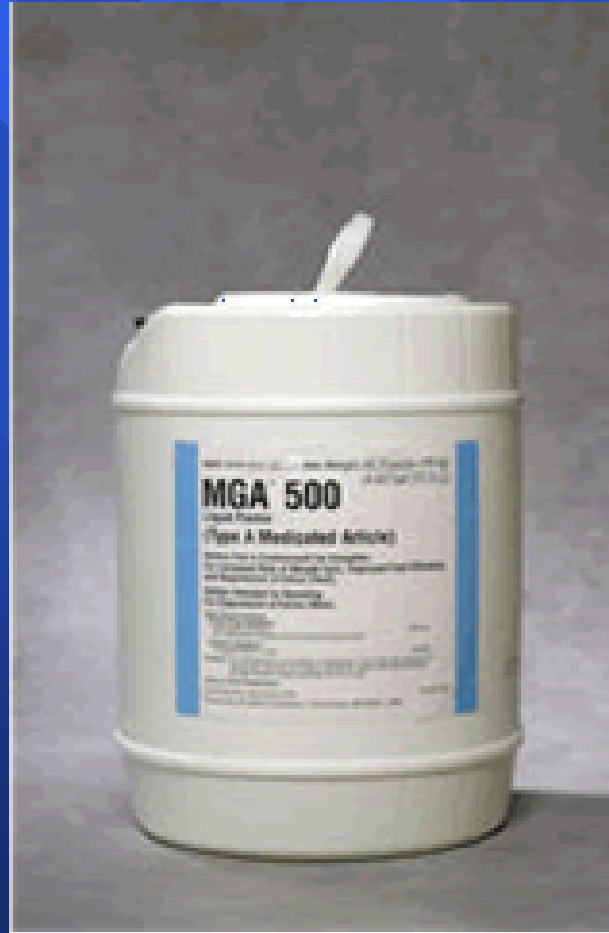
# Characteristics of Estrus



# Distribution of estrus



# MGA<sup>®</sup> Based Protocols



# MGA<sup>®</sup>-PG

Perform TAI at 72 hr after PG with GnRH at TAI



**Labor costs: Medium**

**Drug costs: Medium**

**Recommend: Replacement Heifers**

# MGA<sup>®</sup>-PG

Perform TAI at 72 hr after PG with GnRH at TAI

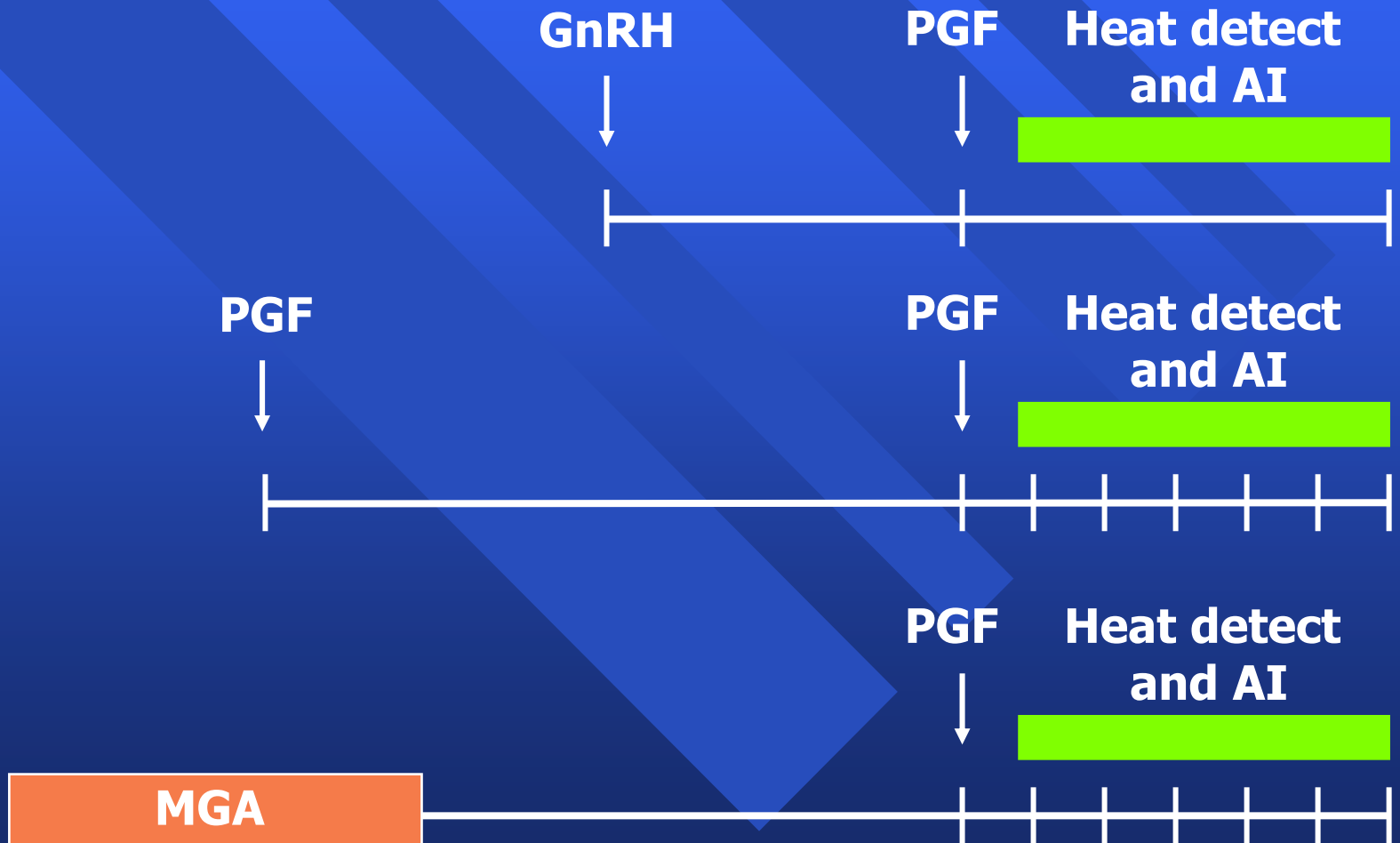


**Labor costs: Medium**

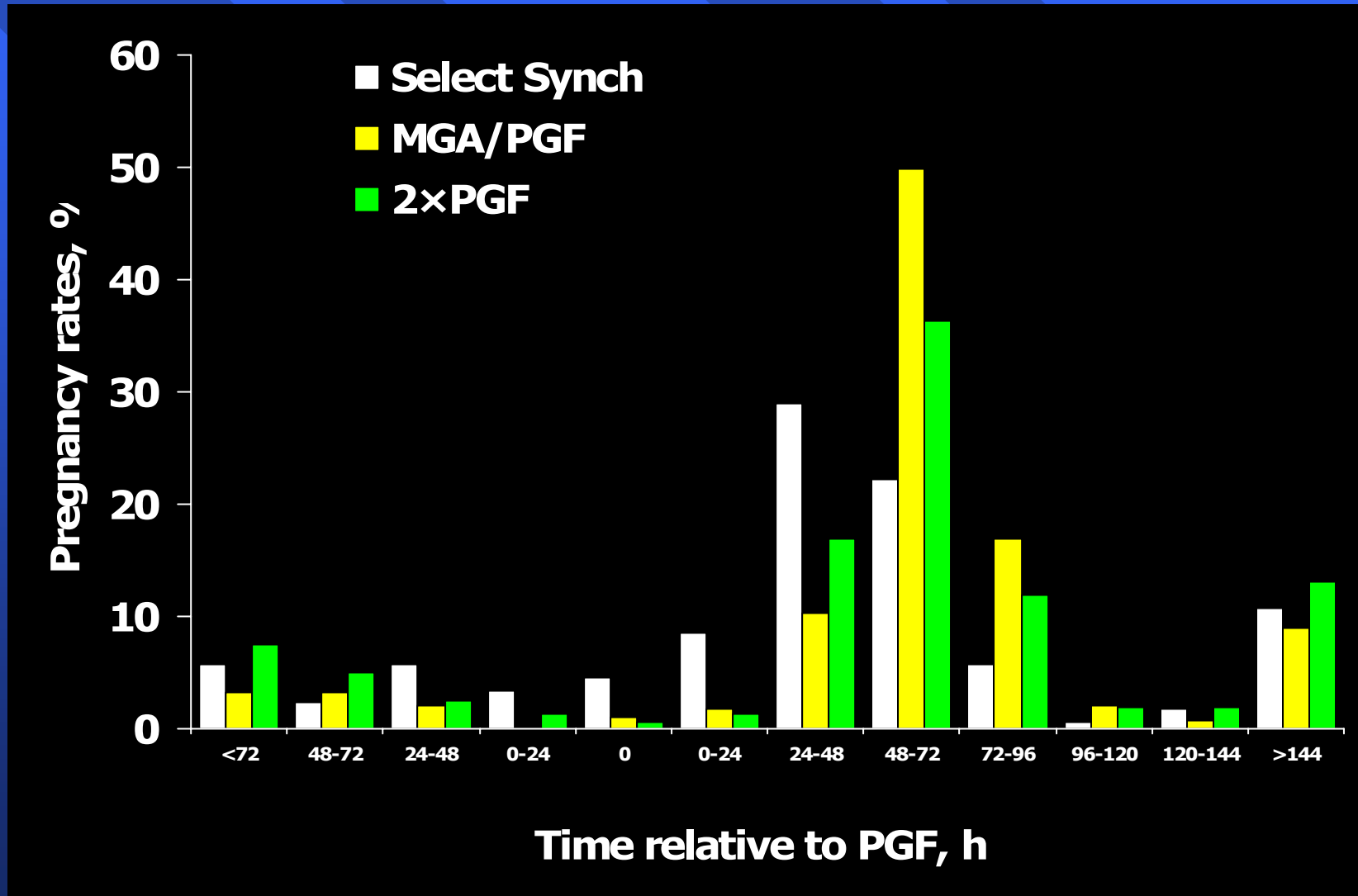
**Drug costs: Medium**

**Recommend: Replacement Heifers**

# Select Synch vs. 2xPGF<sub>2α</sub> vs.MGA/PGF<sub>2α</sub>



# Effect of days postpartum on pregnancy rates after treatment with GnRH



(Lamb et al., 2004)

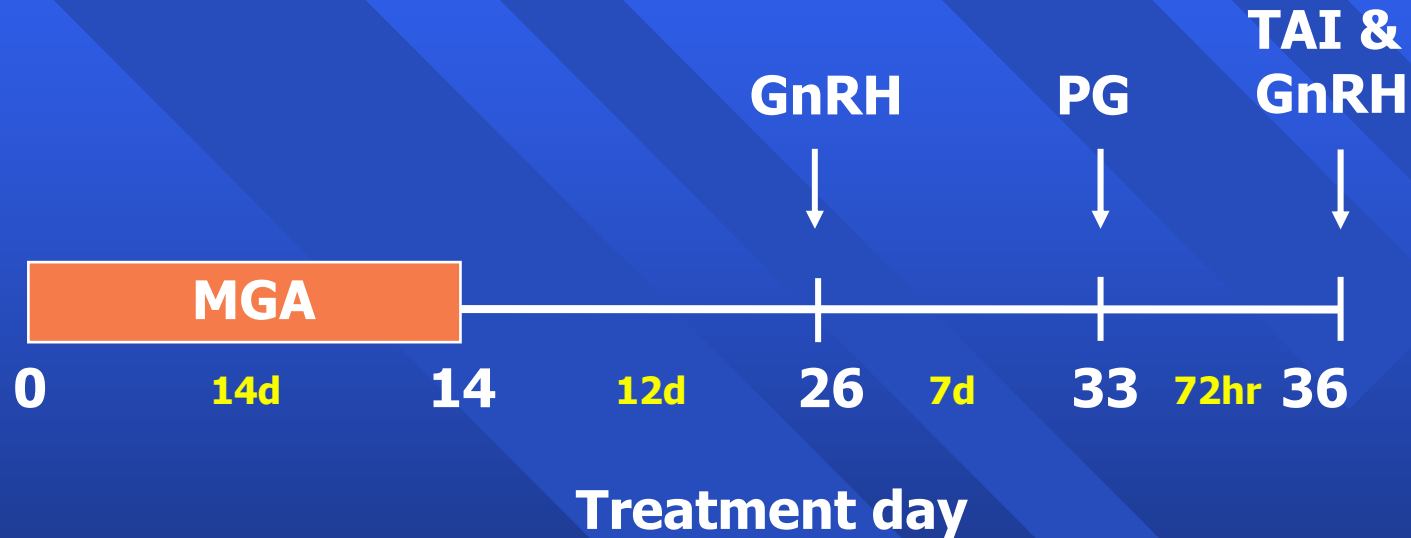
# Select Synch vs. 2xPG vs.MGA/PG in replacement beef heifers

<b>Item</b>	<b>2xPGF<sub>2a</sub></b>	<b>MGA/PGF<sub>2a</sub></b>	<b>Select Synch</b>
<b>No. of heifers</b>	<b>139</b>	<b>289</b>	<b>160</b>
<b>Synchronization rate, %</b>	<b>75</b>	<b>82</b>	<b>73</b>
<b>Conception rates, %</b>	<b>69</b>	<b>68</b>	<b>64</b>
<b>Pregnancy rates, %</b>	<b>52</b>	<b>56</b>	<b>46</b>

*(Lamb et al., 2004)*

# MGA<sup>®</sup> Select

Perform TAI at 72 hr after PG with GnRH at TAI

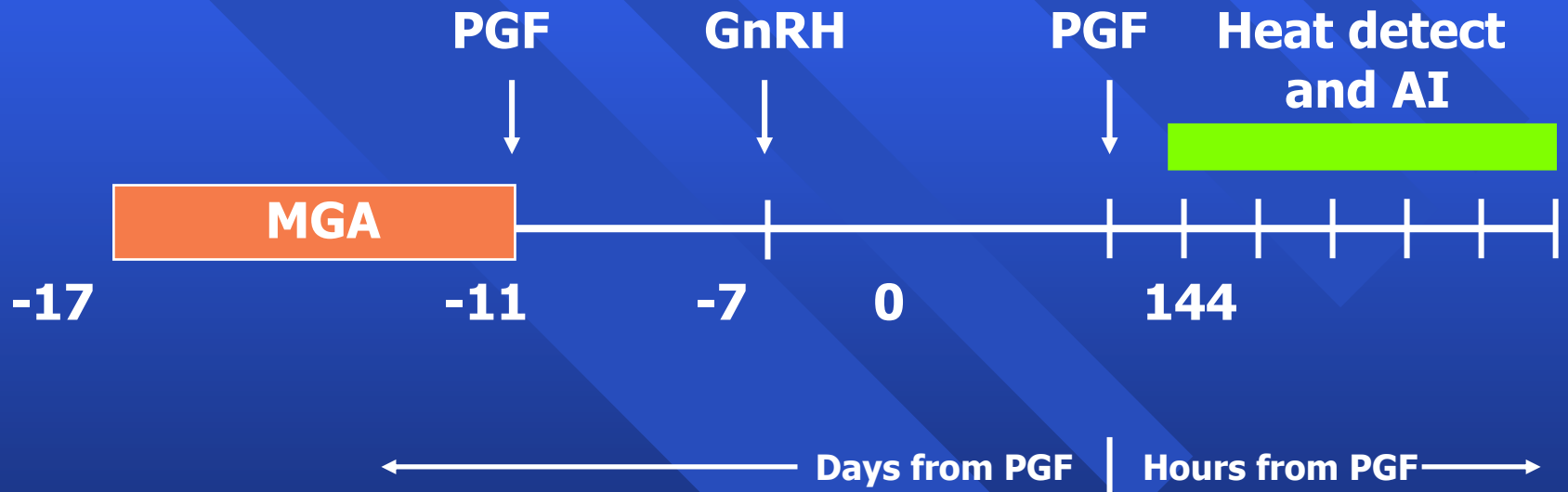


**Labor costs: High**

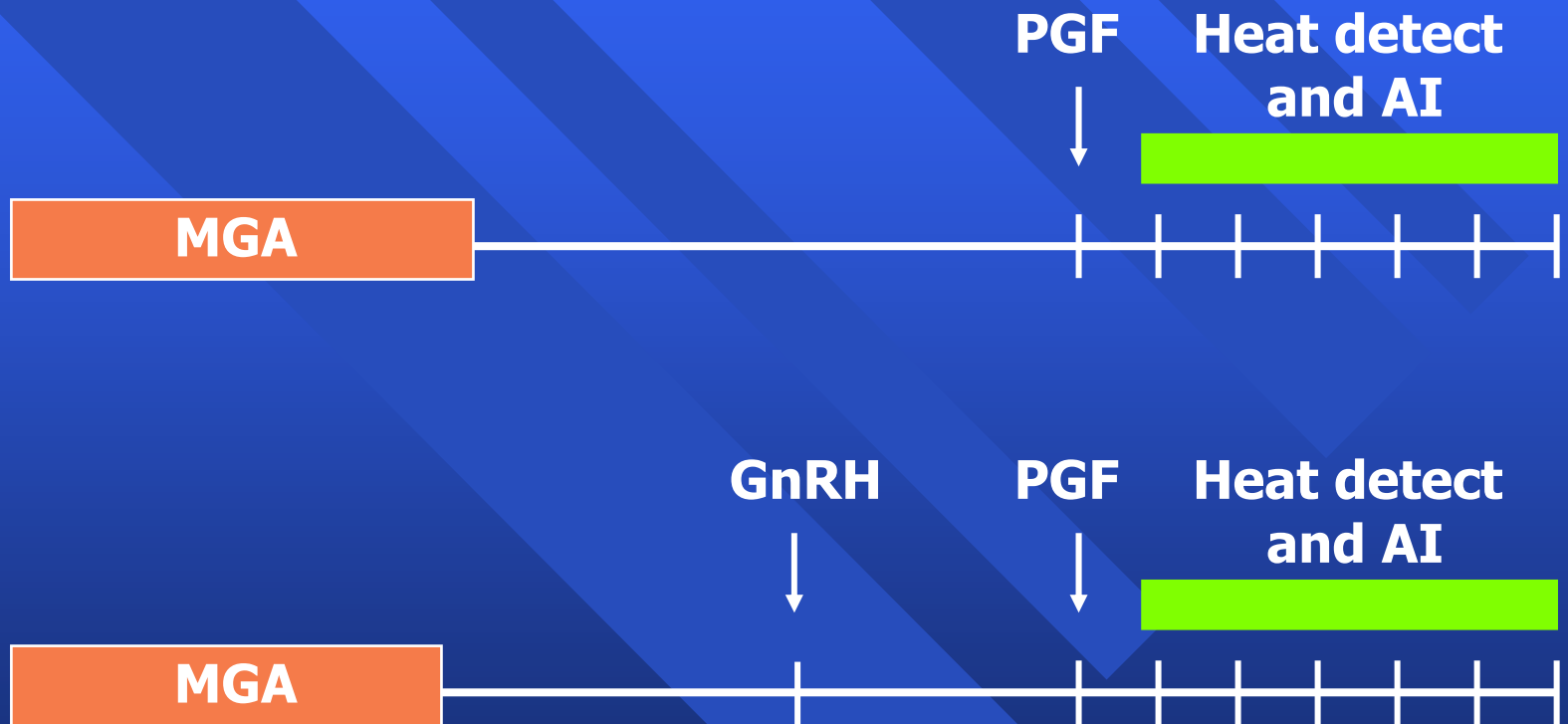
**Drug costs: Medium**

**Recommend: Postpartum cows**

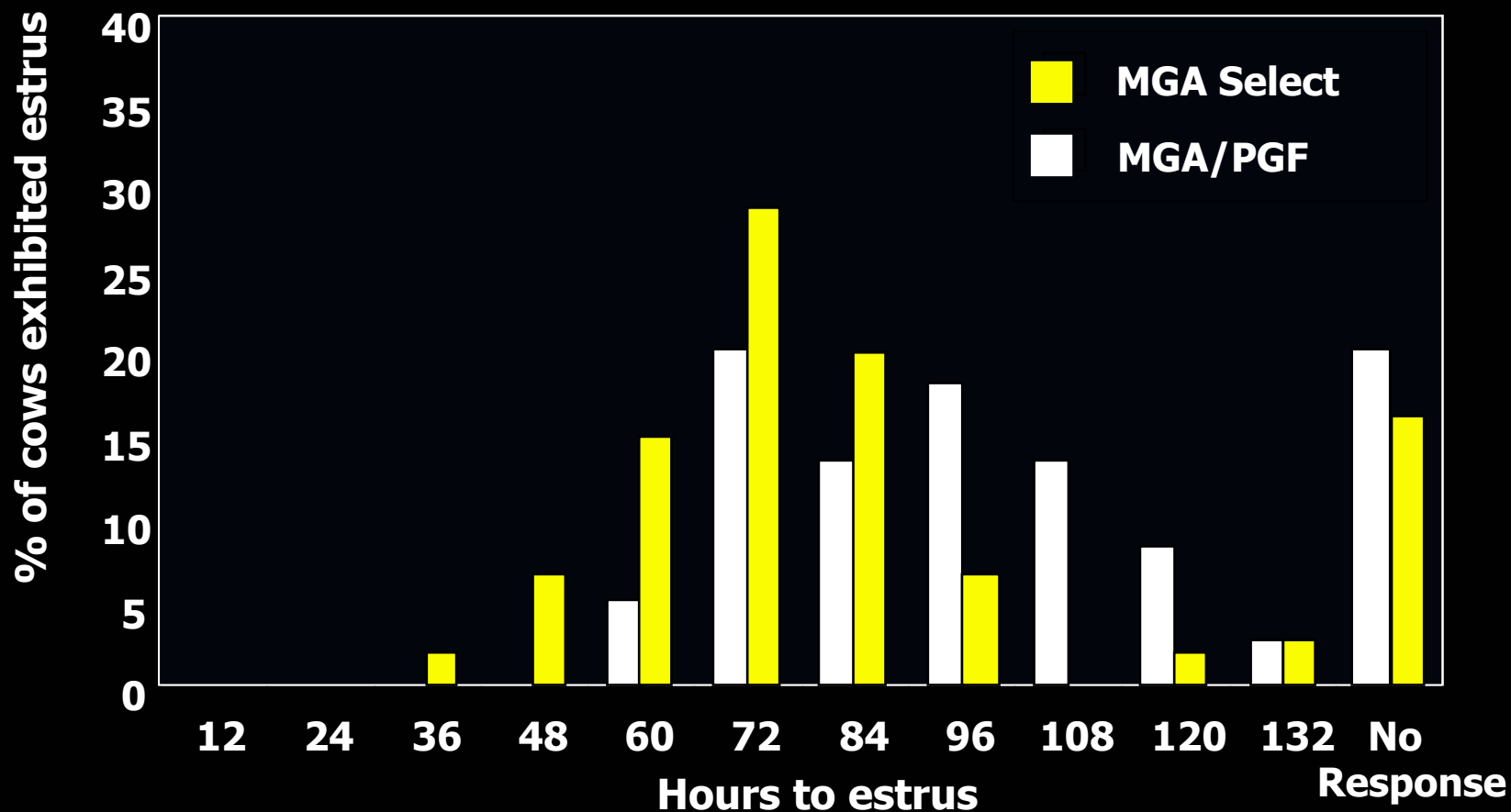
# 7 – 11 Synch



# MGA/PG vs. MGA Select



# Estrus distribution among cows treated with MGA/PGF<sub>2α</sub> or MGA Select



# MGA/PGF<sub>2α</sub> vs. MGA Synch

<b>Item</b>	<b>MGA/PGF<sub>2α</sub></b>	<b>MGA Select</b>
<b>No. of Cows</b>	<b>100</b>	<b>101</b>
<b>Synchronization rate, %</b>	<b>76/100 (76)</b>	<b>88/101 (87)</b>
<b>Conception rates, %</b>	<b>58/76 (76)</b>	<b>67/88 (76)</b>
<b>Pregnancy rates, %</b>	<b>58/100 (58)</b>	<b>67/101 (66)</b>

## Comparison of estrus response and fertility in postpartum beef cows with various estrous synchronization protocols

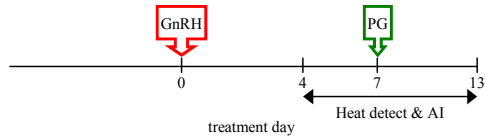
Treatment	SR	PR
<b>2 shot PG</b>	<b>214/422 57%</b>	<b>147/422 35%</b>
<b>Select Synch</b>	<b>353/528 67%</b>	<b>237/528 45%</b>
<b>MGA-PG</b>	<b>161/206 78%</b>	<b>130/206 63%</b>
<b>7-11 Synch</b>	<b>142/155 92%</b>	<b>101/155 65%</b>
<b>MGA Select</b>	<b>Fixed-time AI</b>	<b>281/436 64%</b>

*(Patterson et al., 2004)*

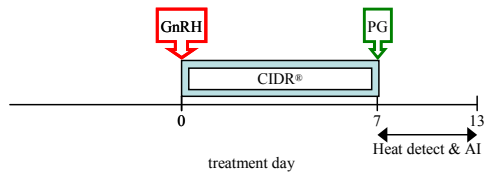
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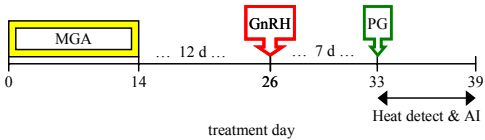
### Select Synch



### Select Synch + CIDR®

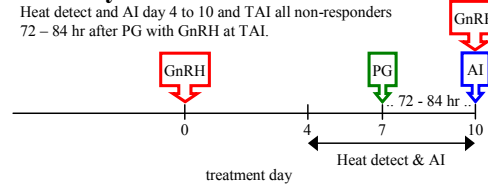


### MGA® Select

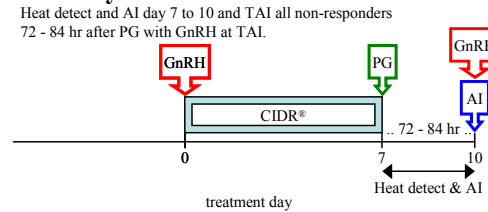


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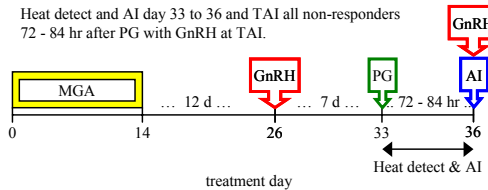
### Select Synch & TAI



### Select Synch + CIDR® & TAI



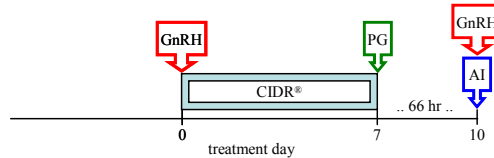
### MGA® Select & TAI



## FIXED-TIME AI (TAI)

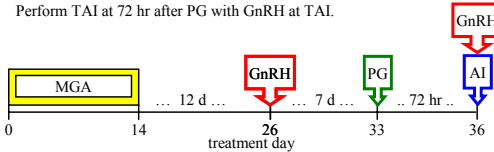
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## COMPARISON OF PROTOCOLS FOR BEEF COWS

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Select Synch + CIDR®	High	Medium
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### HEAT DETECT & TAI

Select Synch (TAI non-responders 72-84 hr after PG)	Low	Medium/High
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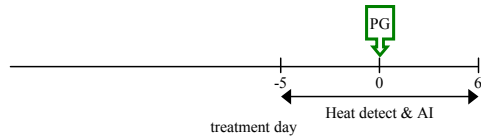
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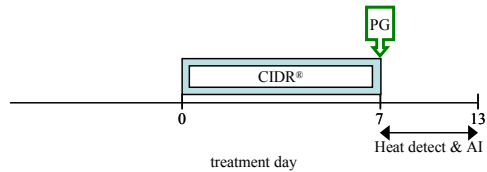
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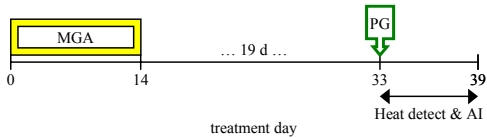
### 1 Shot PG



### CIDR®-PG



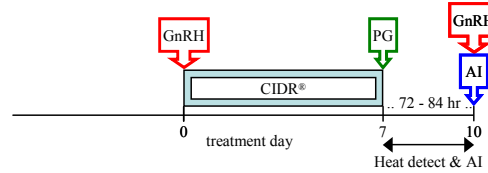
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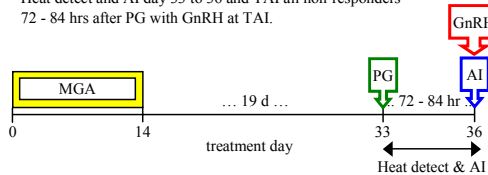
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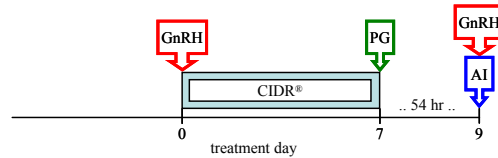
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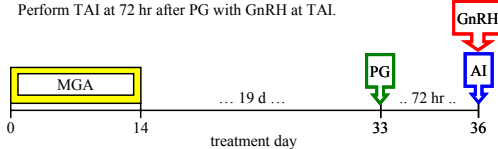
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COMPARISON OF PROTOCOLS FOR BEEF HEIFERS		
HEAT DETECTION	COST	LABOR
1 Shot PG	Low	High
CIDR®-PG	Medium	Medium
MGA®-PG	Low	Low/Medium
HEAT DETECT & TAI		
Select Synch + CIDR® (TAI non-responders 72-84 hr after PG)	High	Medium
MGA®-PG (TAI non-responders 72-84 hr after PG)	Medium	Medium
FIXED-TIME AI (TAI)		
CO-Synch + CIDR® (TAI at 54 hr after PG with GnRH at TAI)	High	Medium
MGA®-PG (TAI at 72 hr after PG with GnRH at TAI)	Medium	Medium

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