

Estrus Synchronization Protocols for Cows

Cliff Lamb
University of Minnesota

Applied Reproductive Strategies in Beef Cattle
September 11, 2007



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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

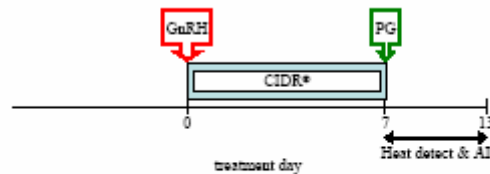
BEEF COW PROTOCOLS

HEAT DETECTION

Select Synch



Select Synch + CIDR®



HEAT DETECT & TIME AI (TAI)

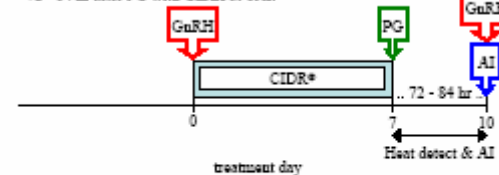
Select Synch & TAI

Heat detect and AI day 4 to 10 and TAI all non-responders 72 - 84 hr after PG with GnRH at TAI.



Select Synch + CIDR® & TAI

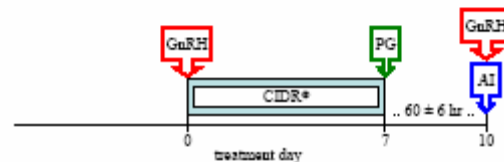
Heat detect and AI day 7 to 10 and TAI all non-responders 72 - 84 hr after PG with GnRH at TAI.



FIXED-TIME AI (TAI)*

CO-Synch + CIDR®

Perform TAI at 60 ± 6 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


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

FIXED-TIME AI (TAI)

CO-Synch + CIDR® (TAI 60 ± 6 hr after PG with GnRH at TAI)	High	Medium
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* 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.

 Cystorelin®, Factrel®, Fertagy1®, OvaCyst®

 Estrunate®, In-Synch®, Lutalyse®, ProstaMate®, estroPLAN®

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.

2 × Prostaglandin (PGF_{2α}) System



Select Synch



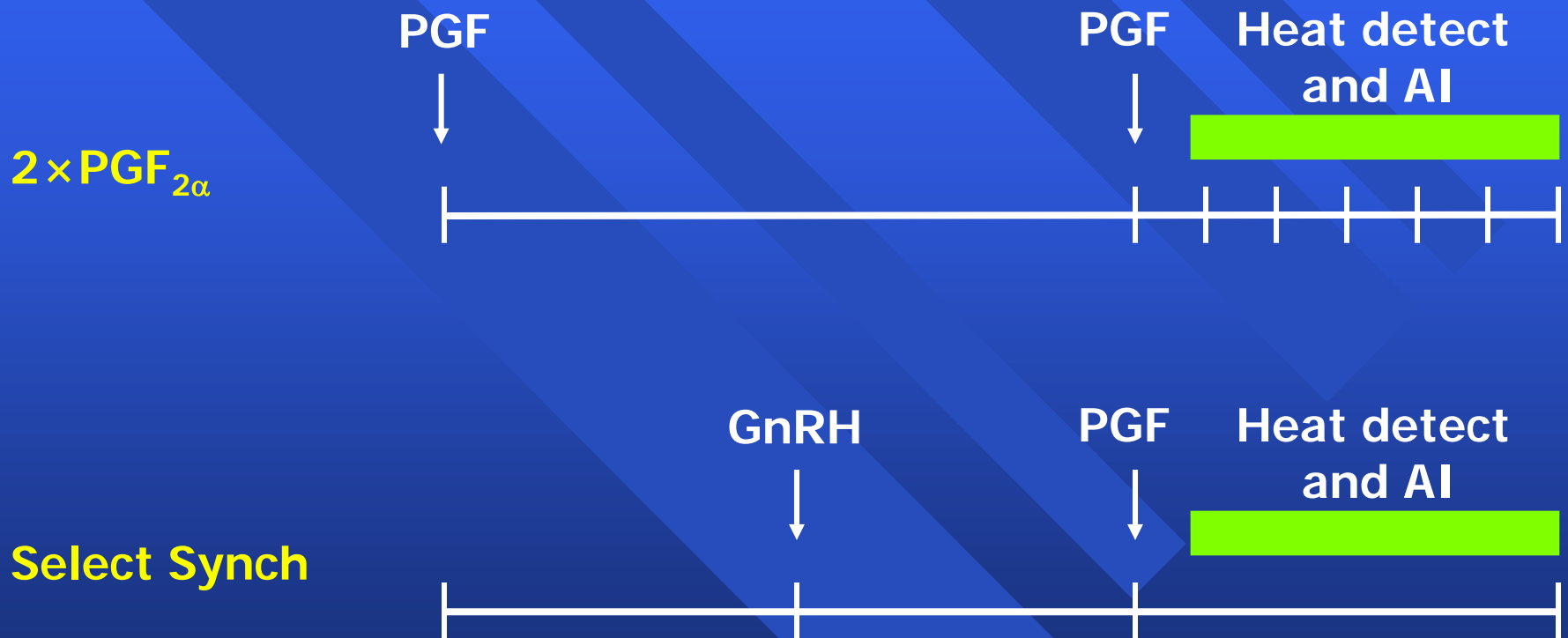
CO-Synch



Select Synch & TAI



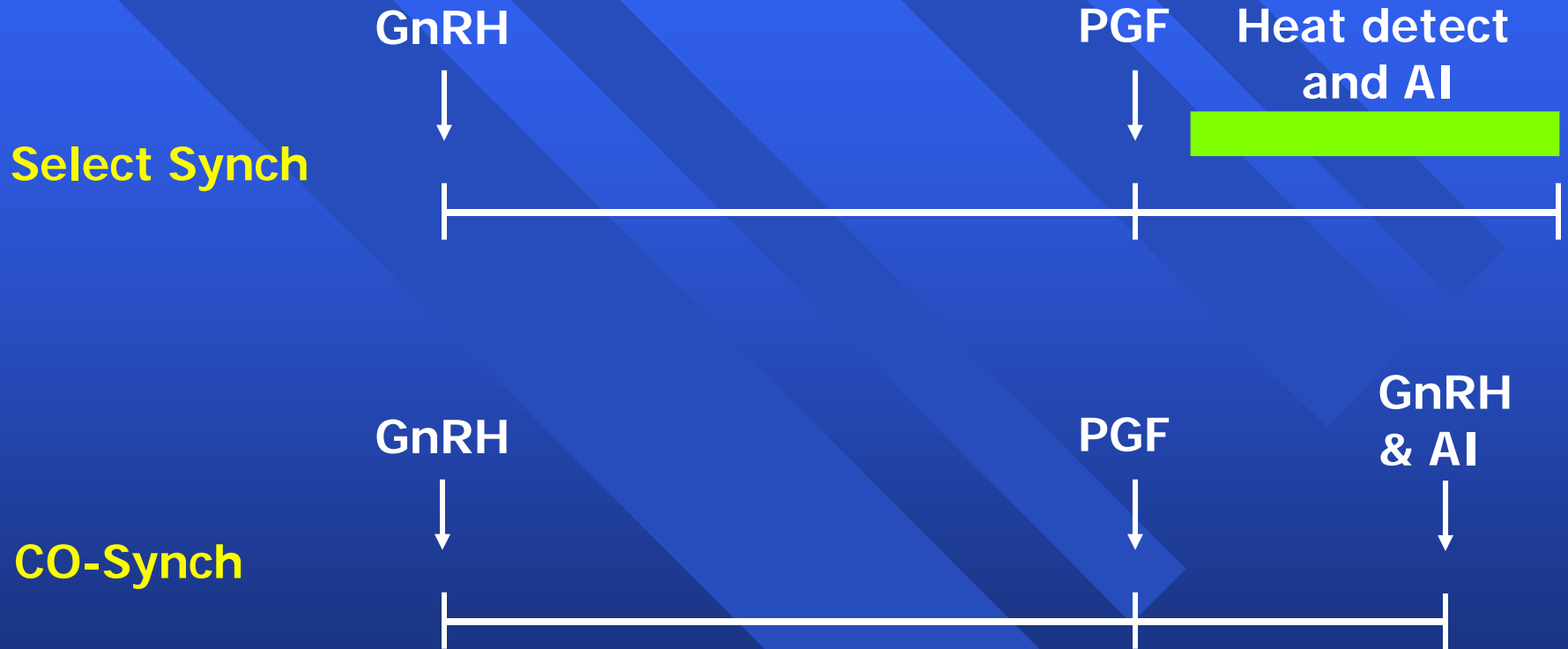
2 × PGF_{2α} vs. Select Synch



2 × PGF_{2α} vs. Select Synch

Item	2 × PGF _{2α}	Select Synch
No. of Cows	294	289
Synchronization rate, %	142/294 (48)	175/289 (61)
Conception rates, %	86/142 (61)	115/175 (66)
Pregnancy rates, %	86/294 (28)	115/289 (38)

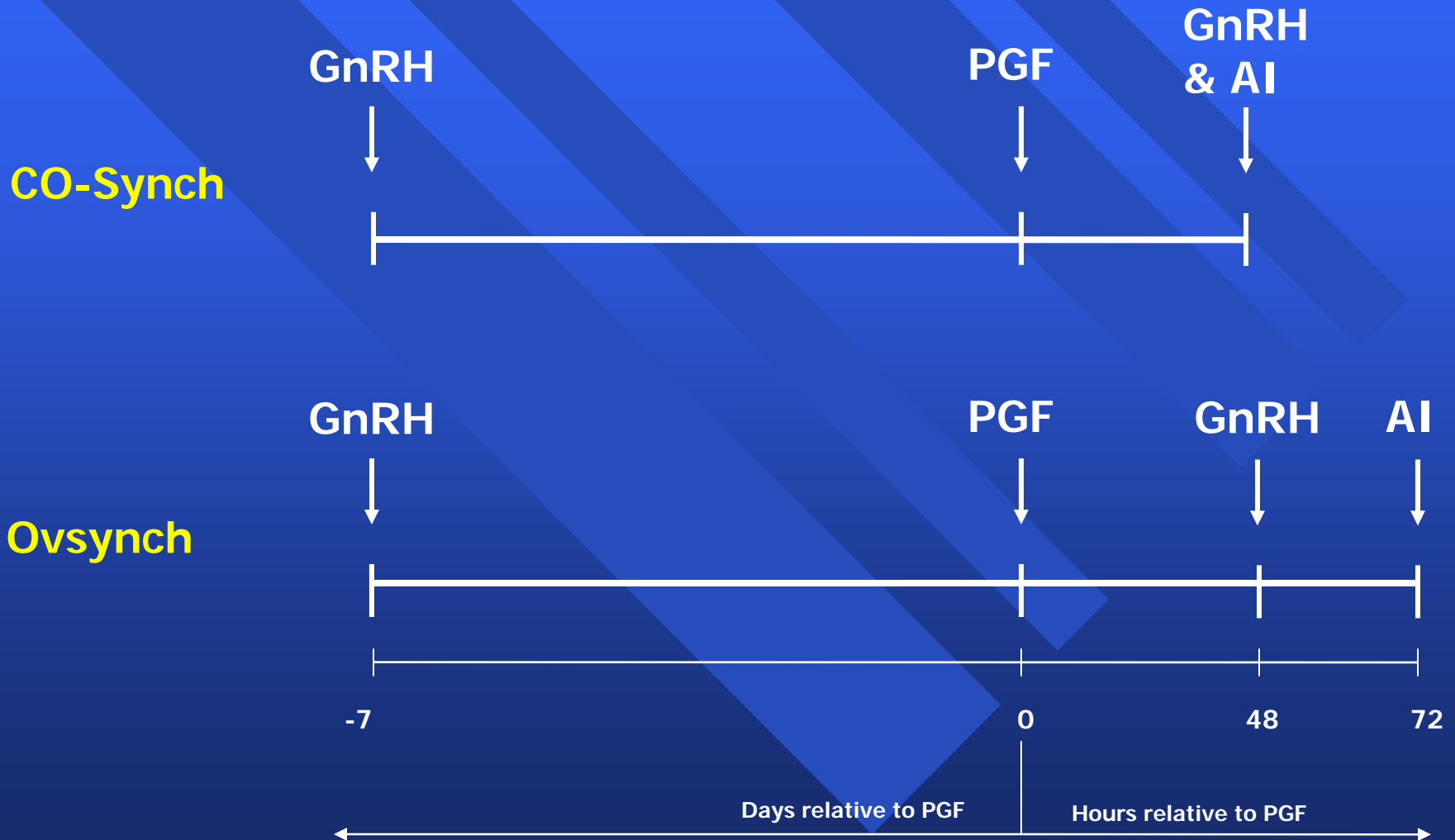
Select Synch vs. CO-Synch



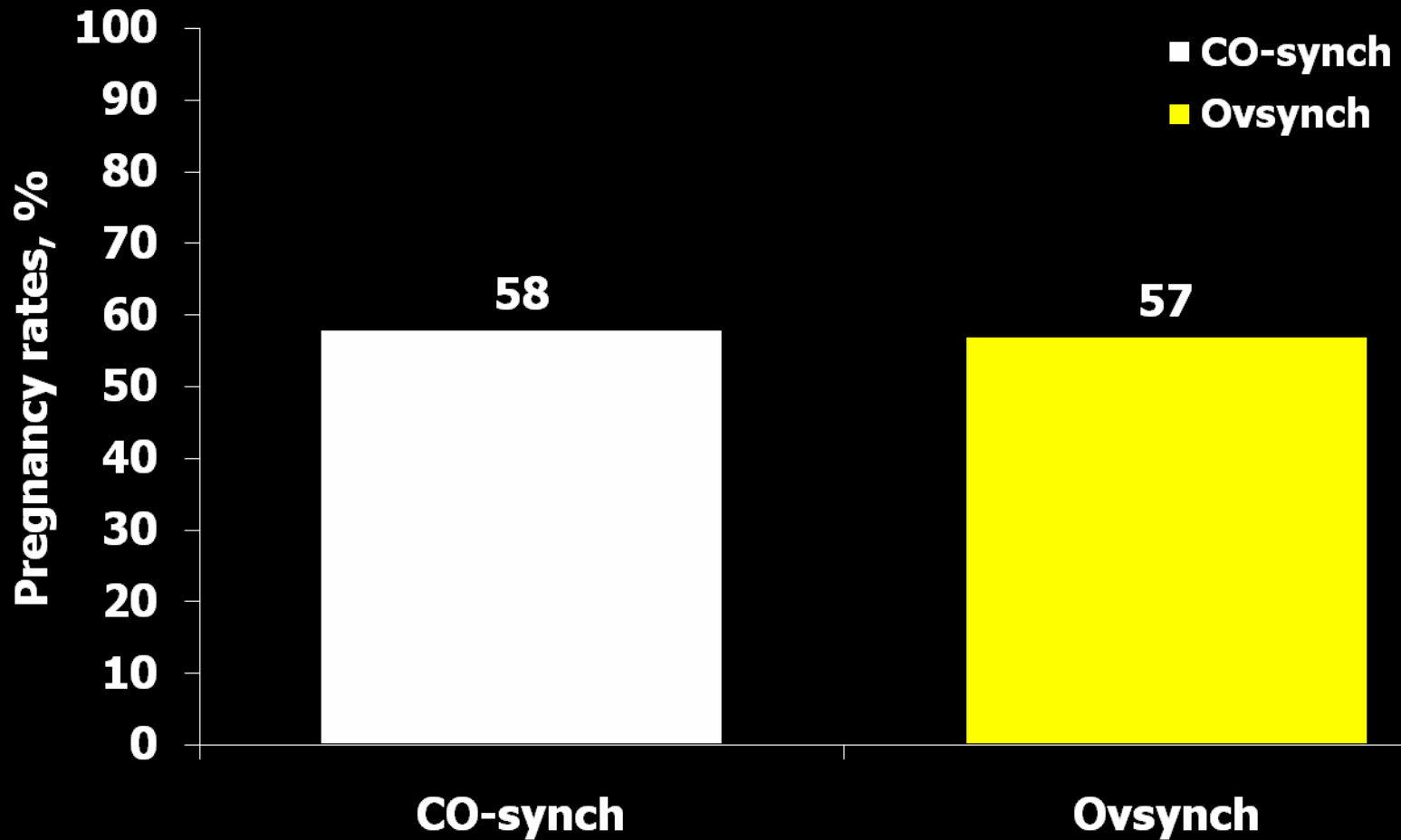
Select Synch vs. CO-Synch

Item	Select Synch	CO-Synch
No. of Cows	237	223
Synchronization rate, %	130/237 (55)	-
Conception rates, %	93/130 (72)	106/223 (48)
Pregnancy rates, %	93/237 (39)	106/223 (48)

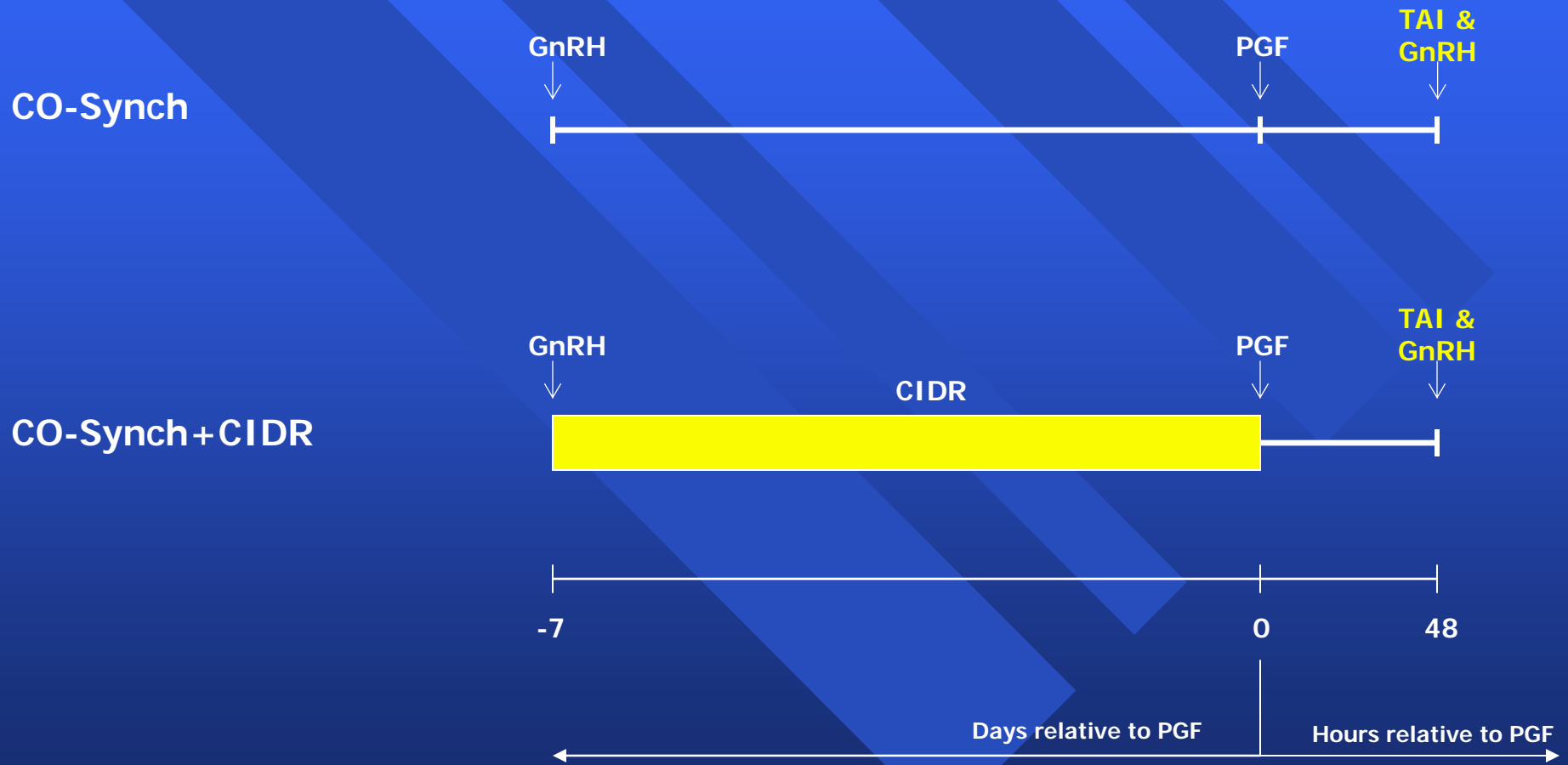
CO-Synch vs. Ovsynch



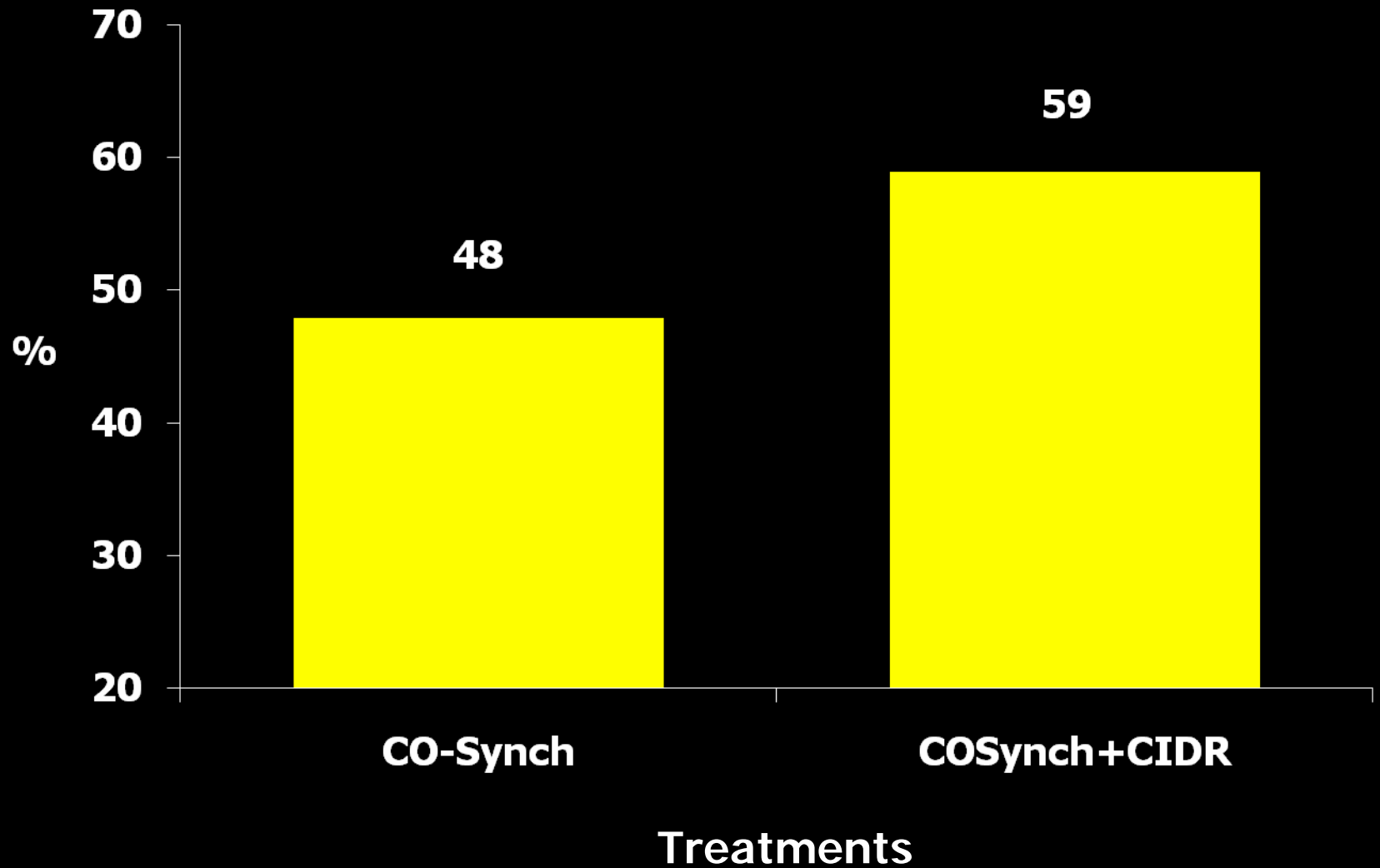
CO-Synch vs. Ovsynch



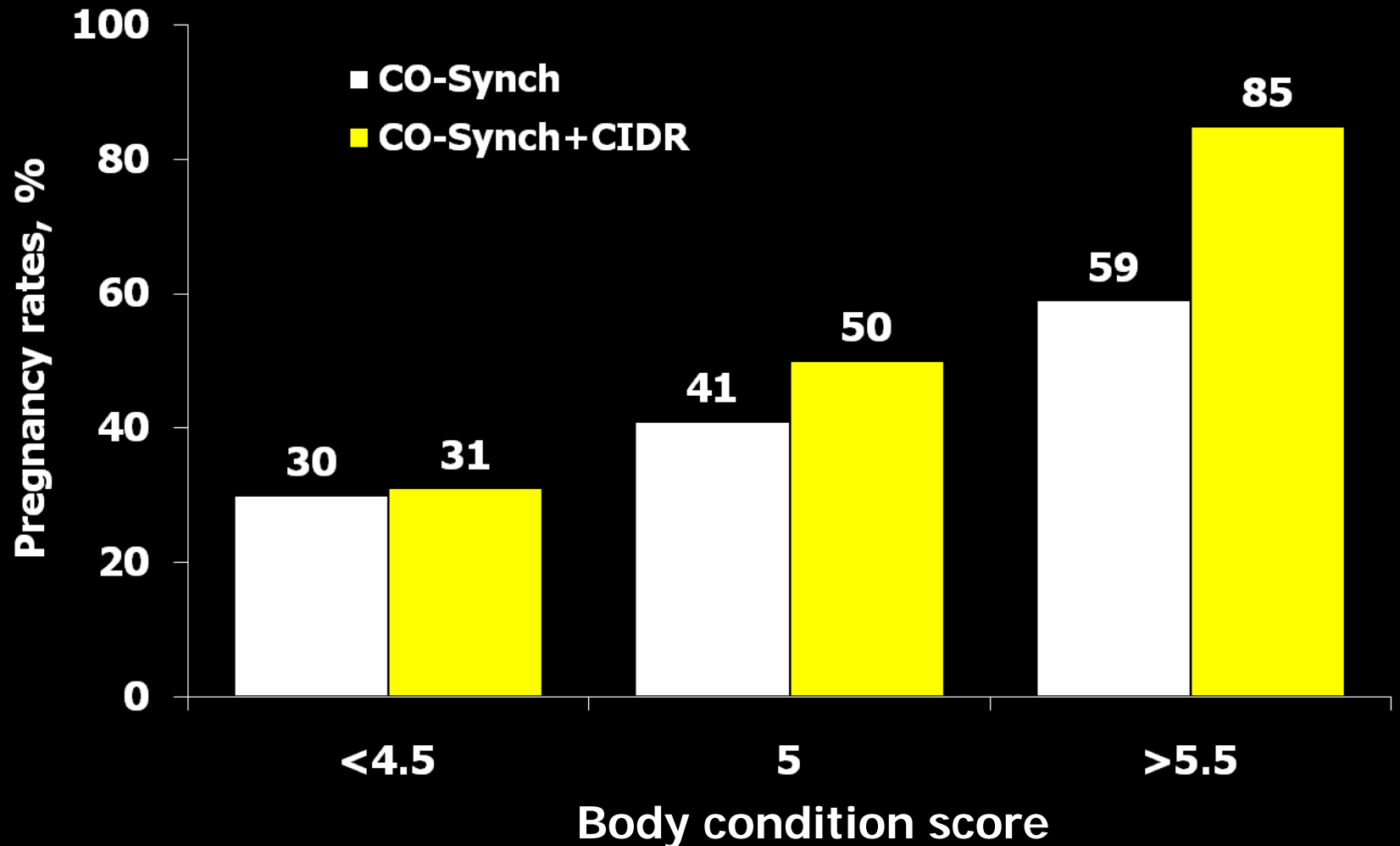
CO-synch vs. CO-synch+CIDR

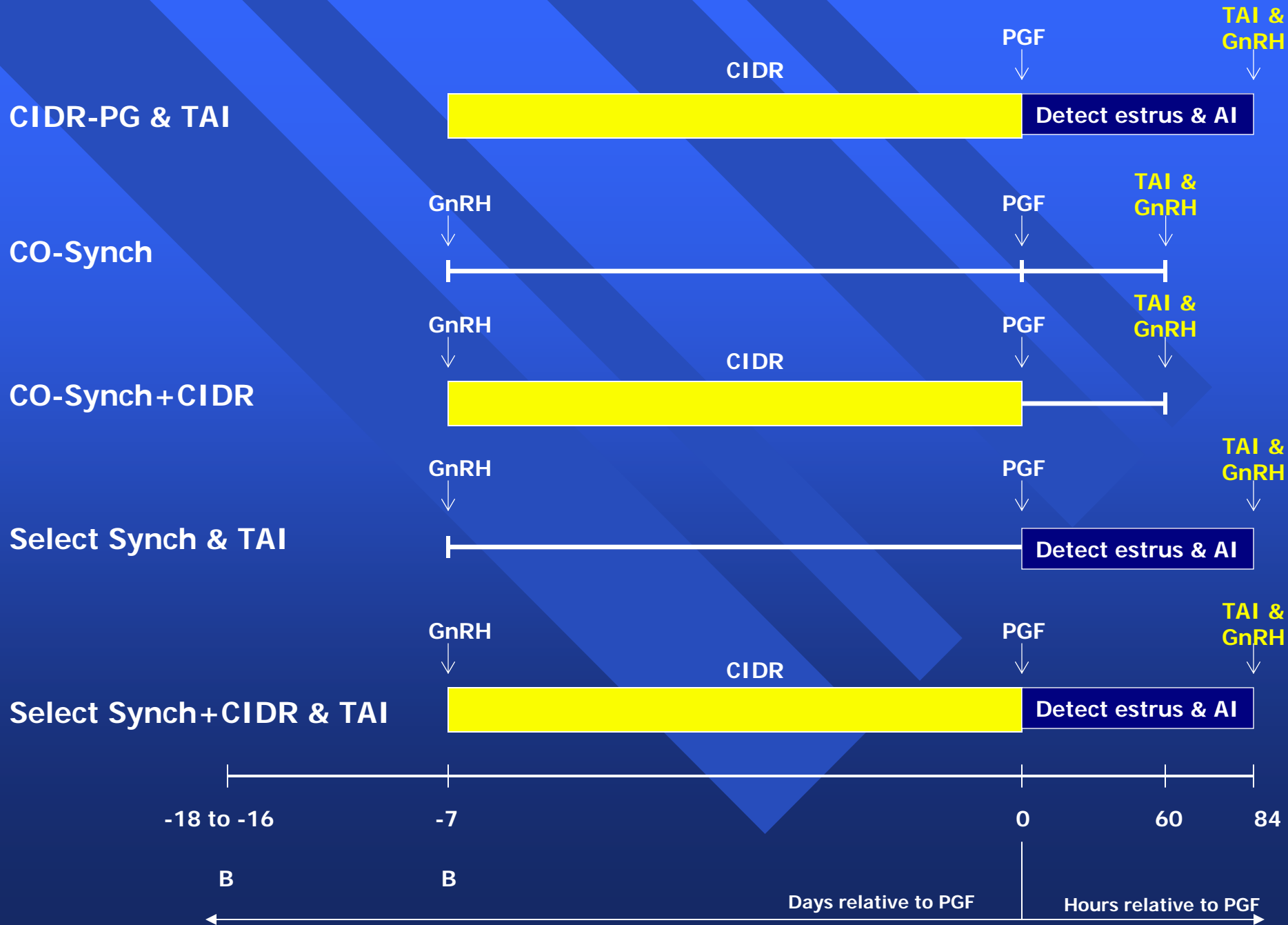


First Service Pregnancy Rates

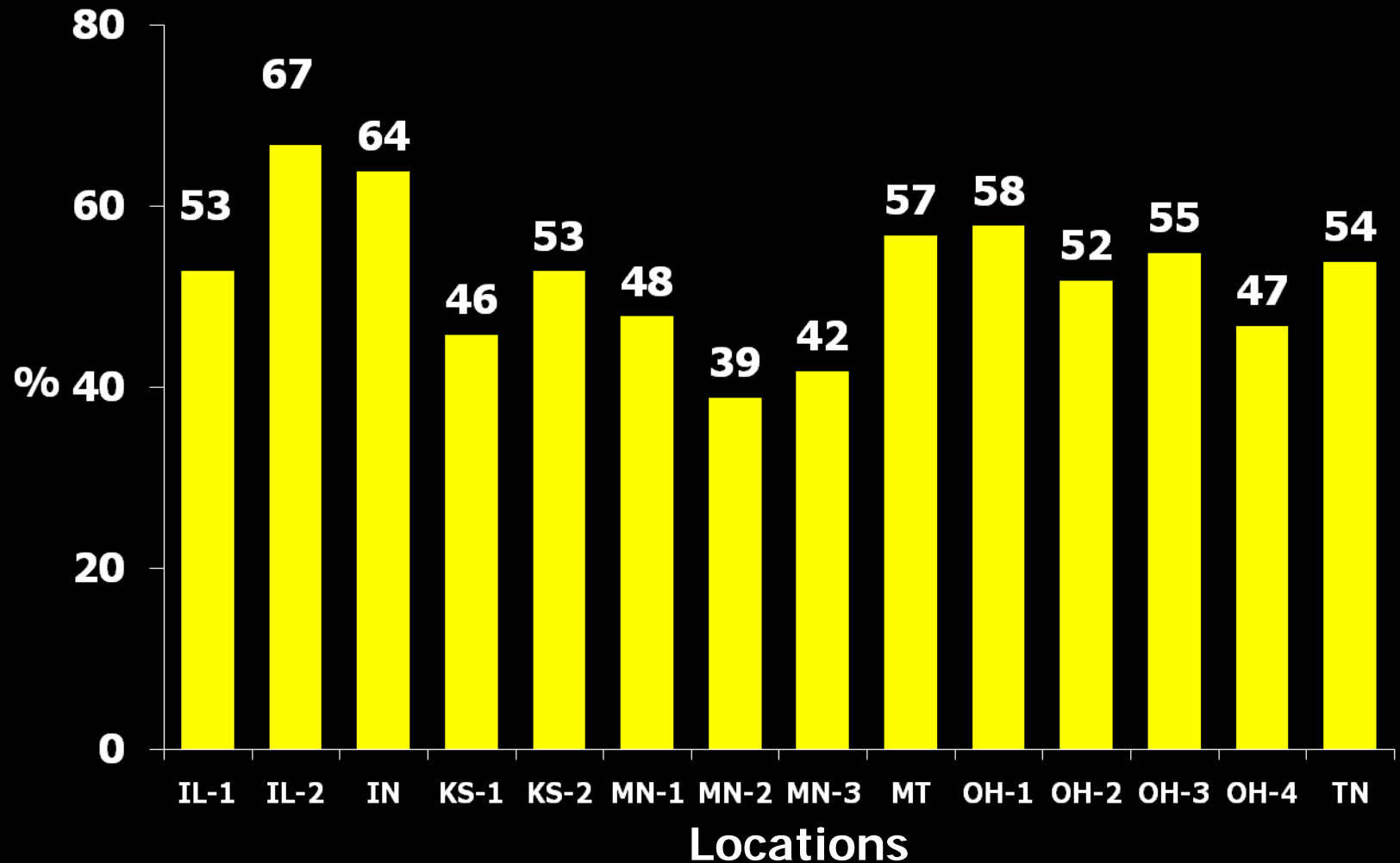


Effect of BCS on Pregnancy Rates

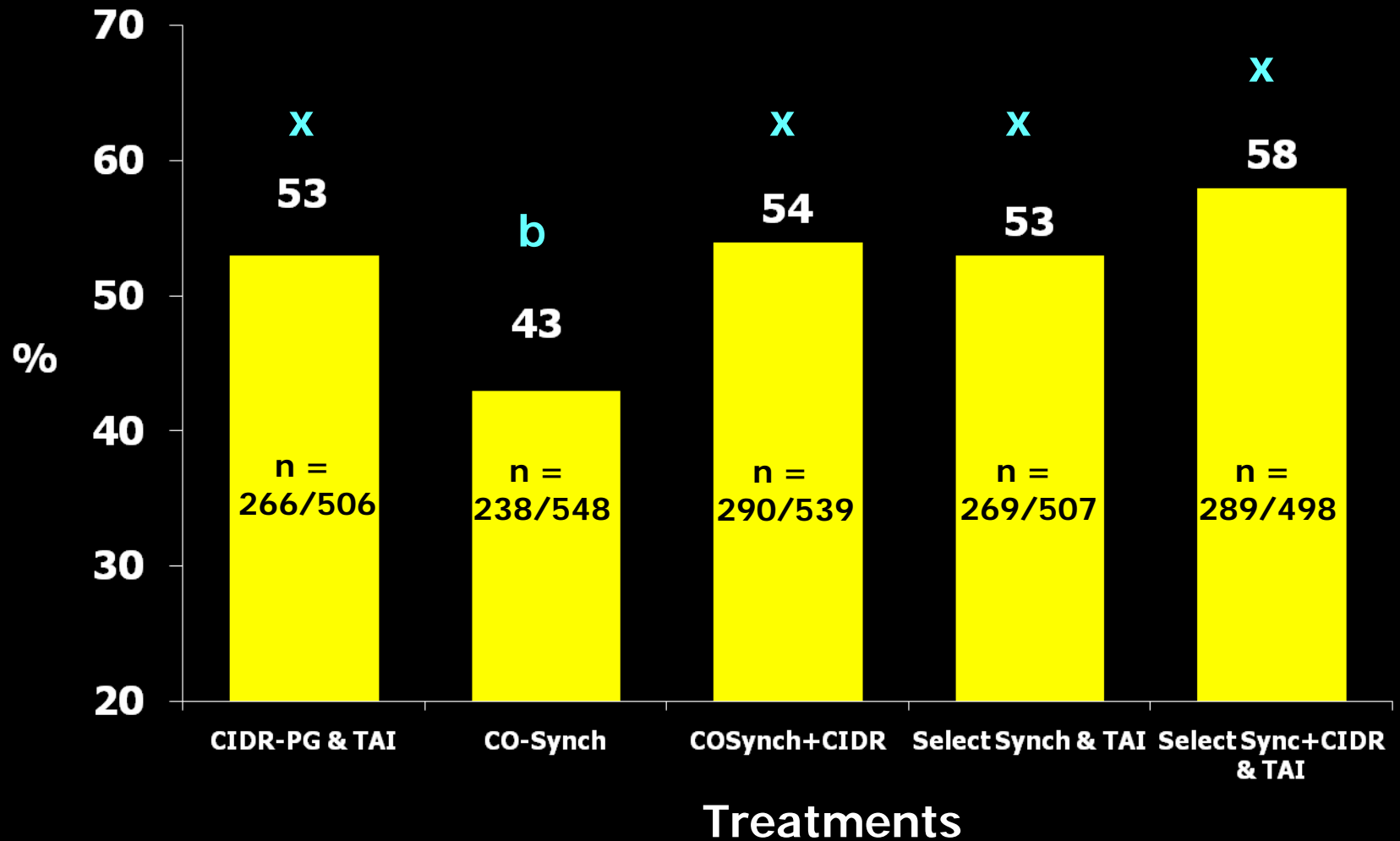




Effect of Location on Pregnancy Rates

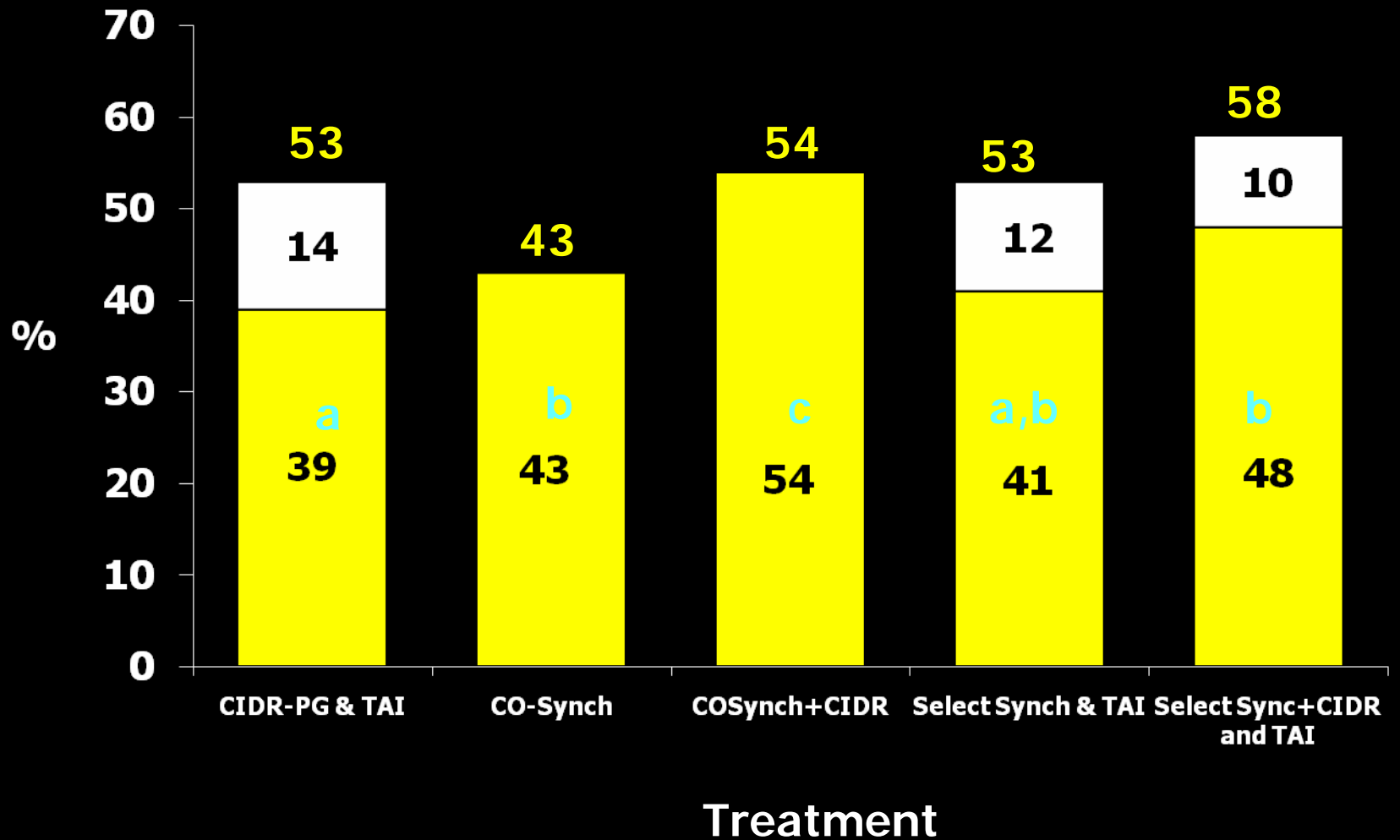


First Service Pregnancy Rates



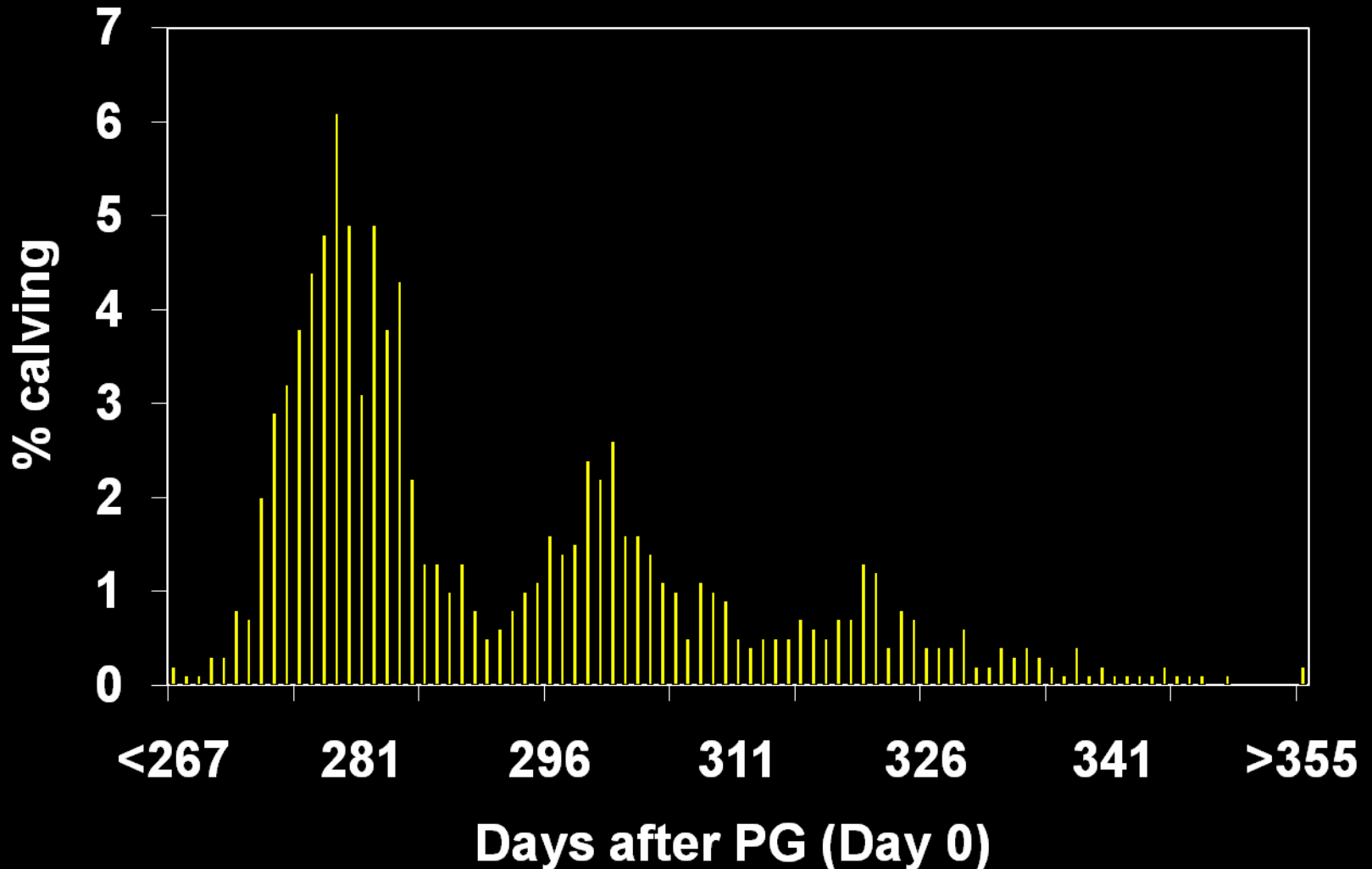
$P < 0.05$

Pregnancy Rates after Estrus Detection Alone vs TAI



$P < 0.05$

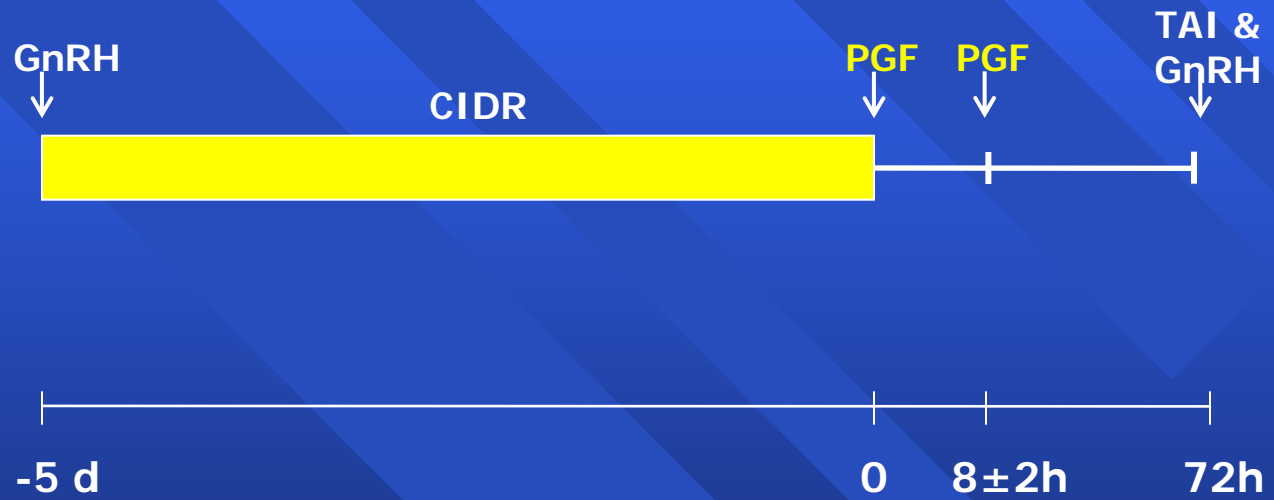
Calving Distribution after Synchronization of Estrous



Calving Characteristics

Treatment	Gestation length	Gender ratio	
		AI calves	Clean-up bulls
PGF-CIDR & TAI	281.2	0.54	0.51
CO-Synch	281.8	0.49	0.50
CO-Synch+CIDR	282.2	0.50	0.57
Select Synch & TAI	281.7	0.57	0.47
Select Synch+CIDR & TAI	281.9	0.53	0.54
Overall	281.7	0.53	0.52
Overall births	994	841	635

5-day CO-Synch + CIDR



5-day CO-Synch + CIDR

Location/year	n	Pregnancy Rate, %				
		5CO-72 2XPGF	7CO-60 2XPGF	5CO-72 1XPGF	5CO-72 1XCLP	5CO-84 1XCLP
OSU, 2005 (2)	216	80.0	66.7	-	-	-
OSU, 2006 (3)	400	65.3	56.2	-	-	-
VT, 2007 (6)	830	69.0	-	52.0	54.3	-
OSU, 2007 (2)	254	69.0	-	-	-	57.9
OSU, 2008 (2)	254	59.4	-	-	-	-
Purdue, 2008 (3)	194	74.2	-	-	-	-
Total (18)	2148	68.2				

(n = 1162)

(Day et al., 2008)

Effects of a fixed-time AI system on calving distribution

Control
n = 285

Natural mating

TAI
n = 263

GnRH

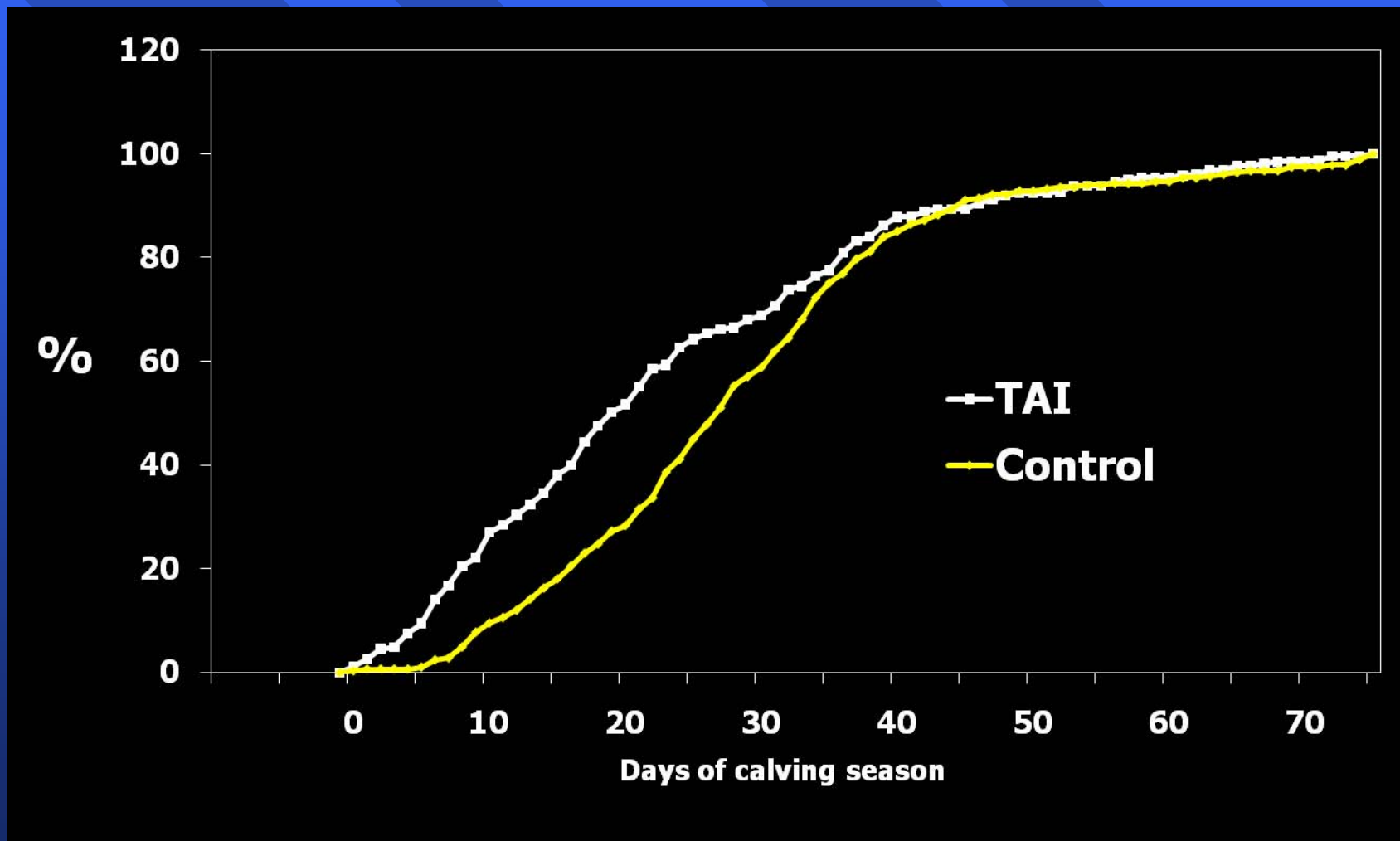
PGF

CIDR

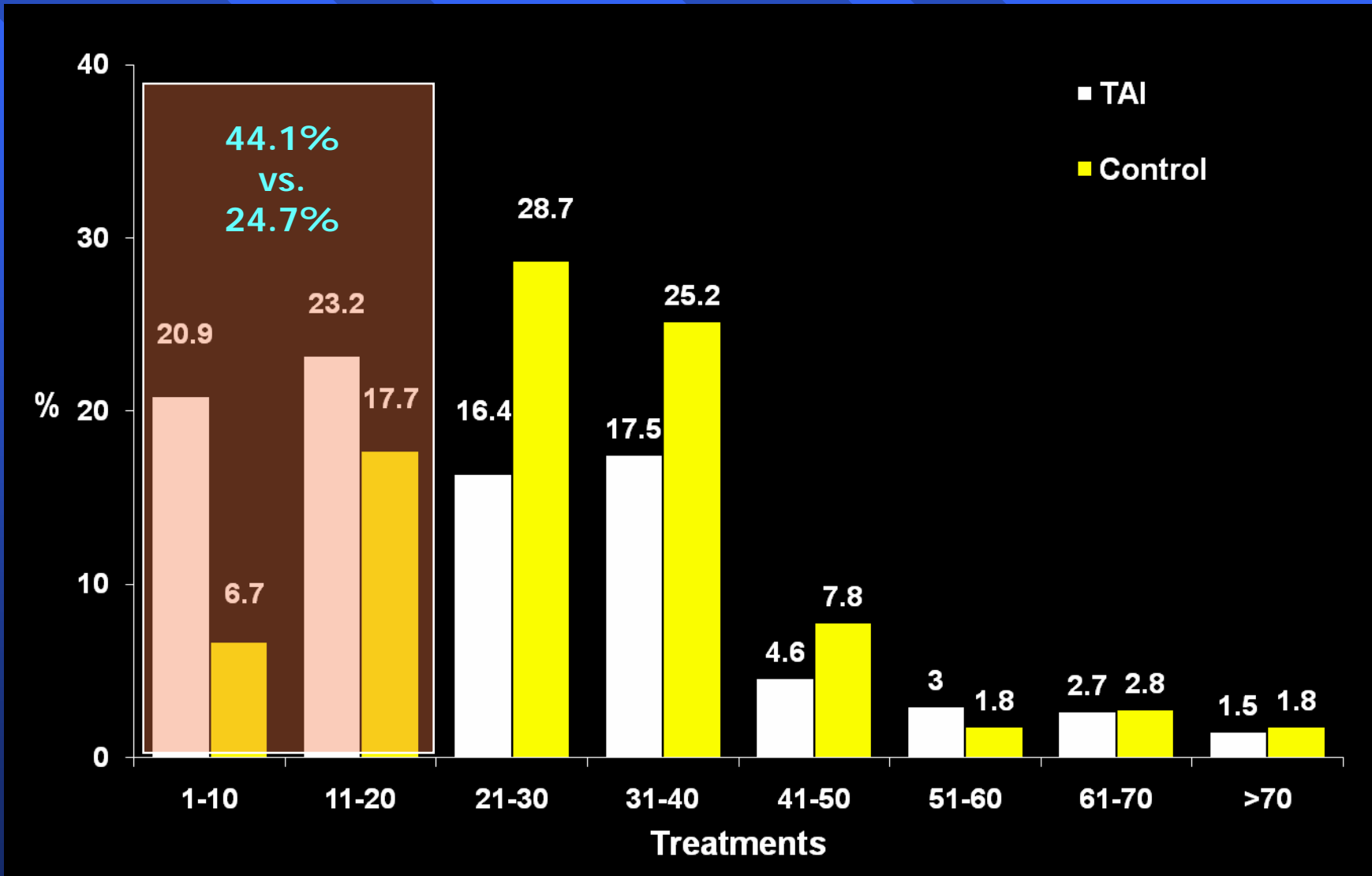
TAI +
GnRH

Natural mating

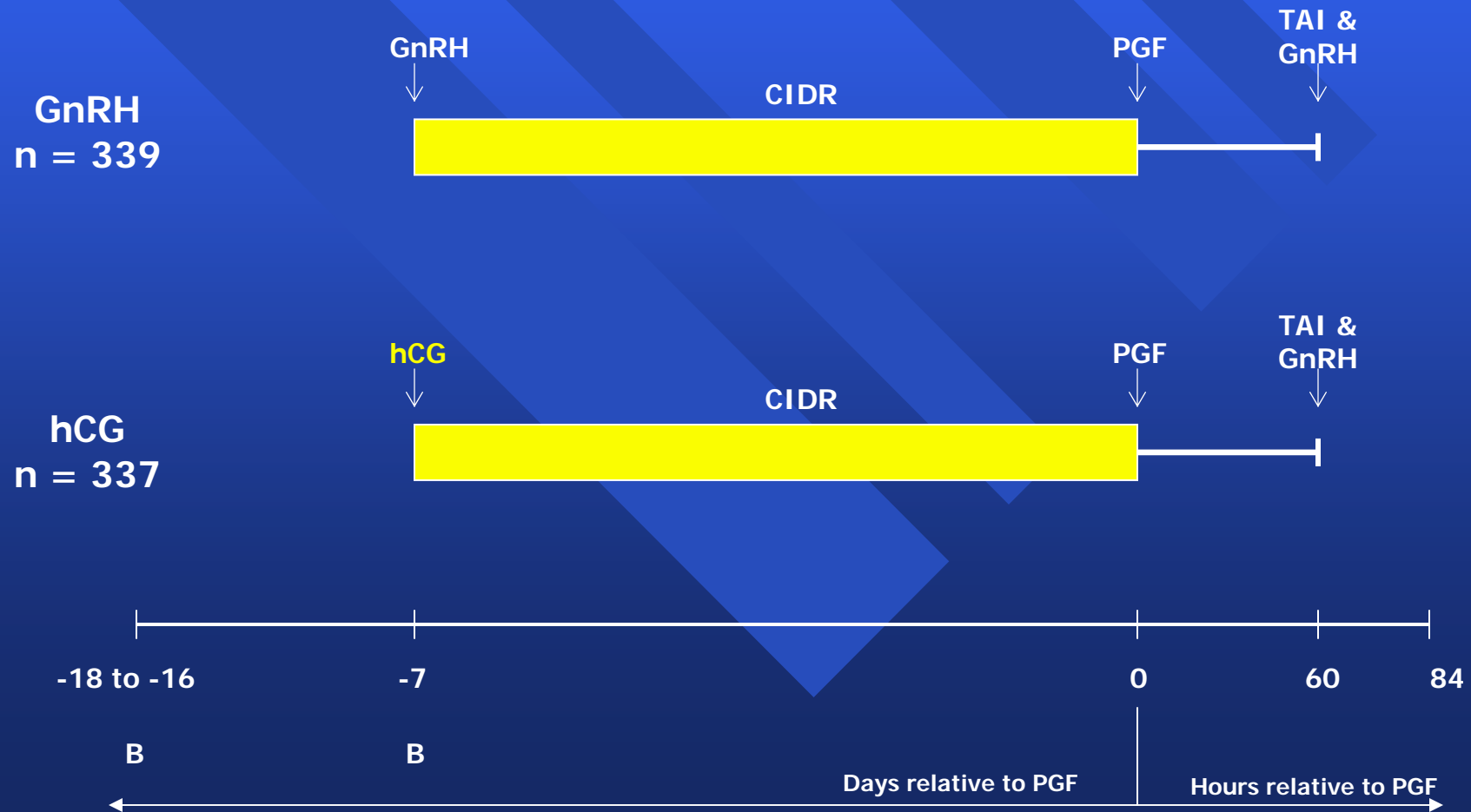
Cumulative Calving during the Calving Season



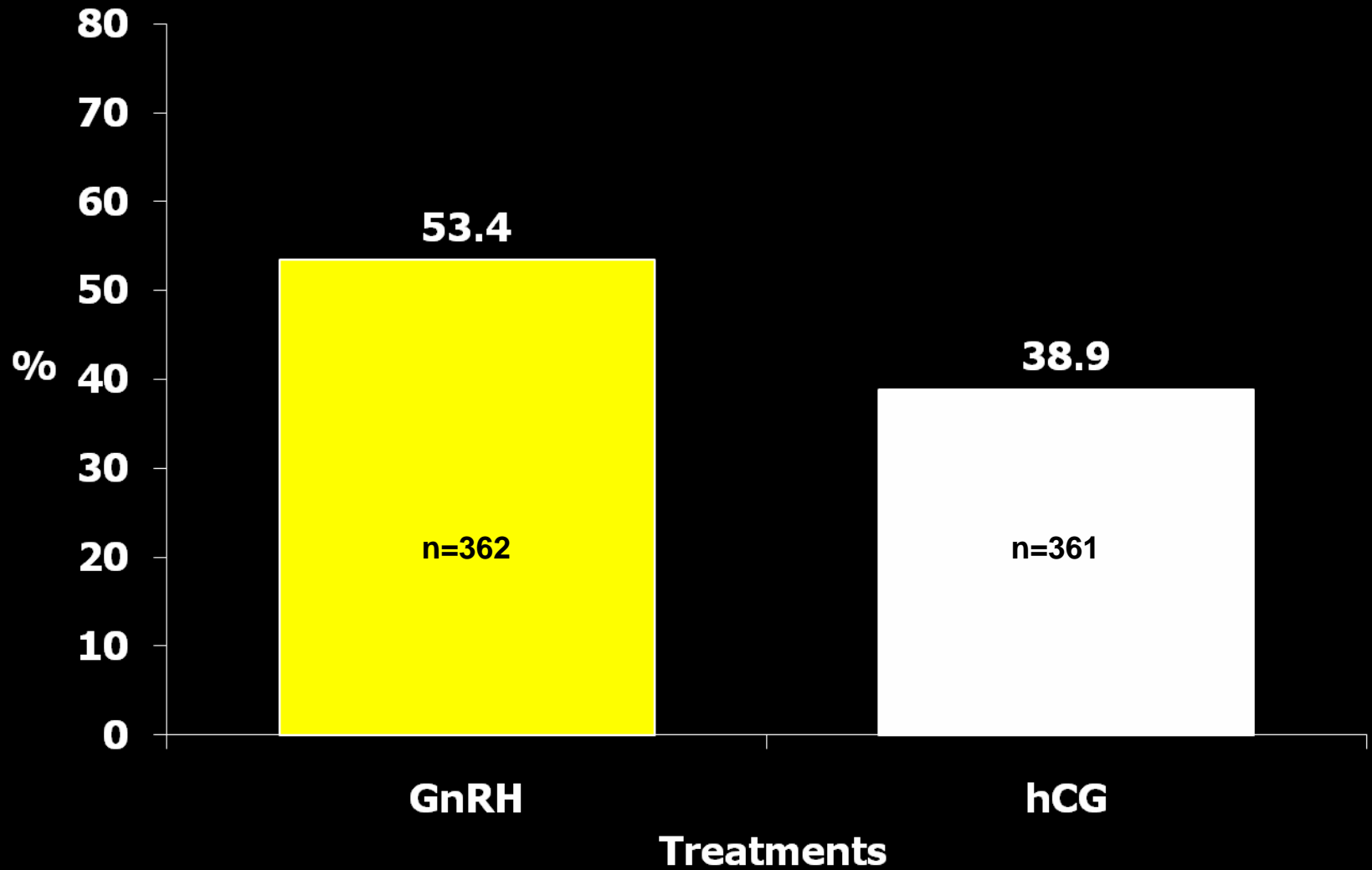
Calving Distribution of Cows Calving after TAI or Bull breeding



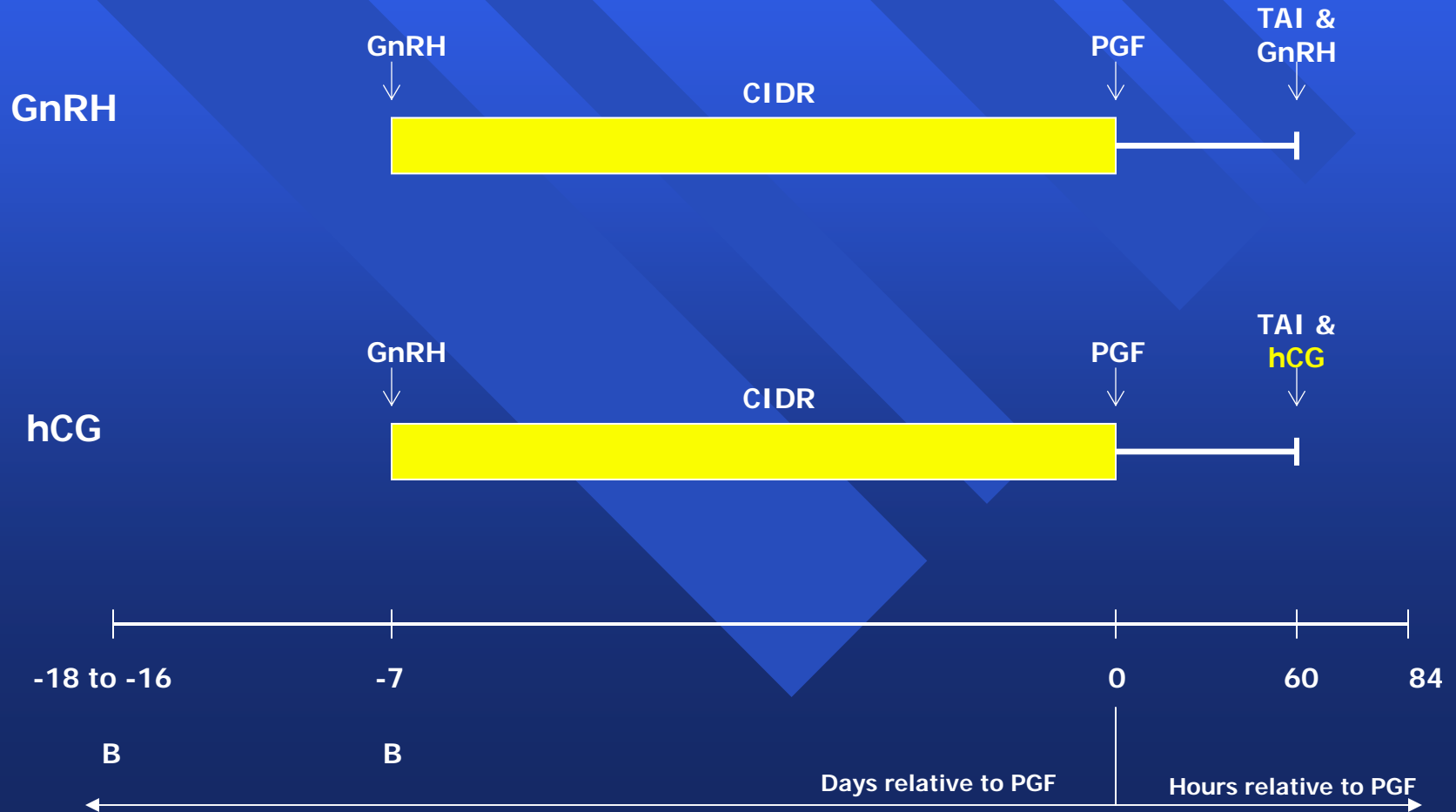
Use of hCG at CIDR insertion in the CO-Synch + CIDR protocol



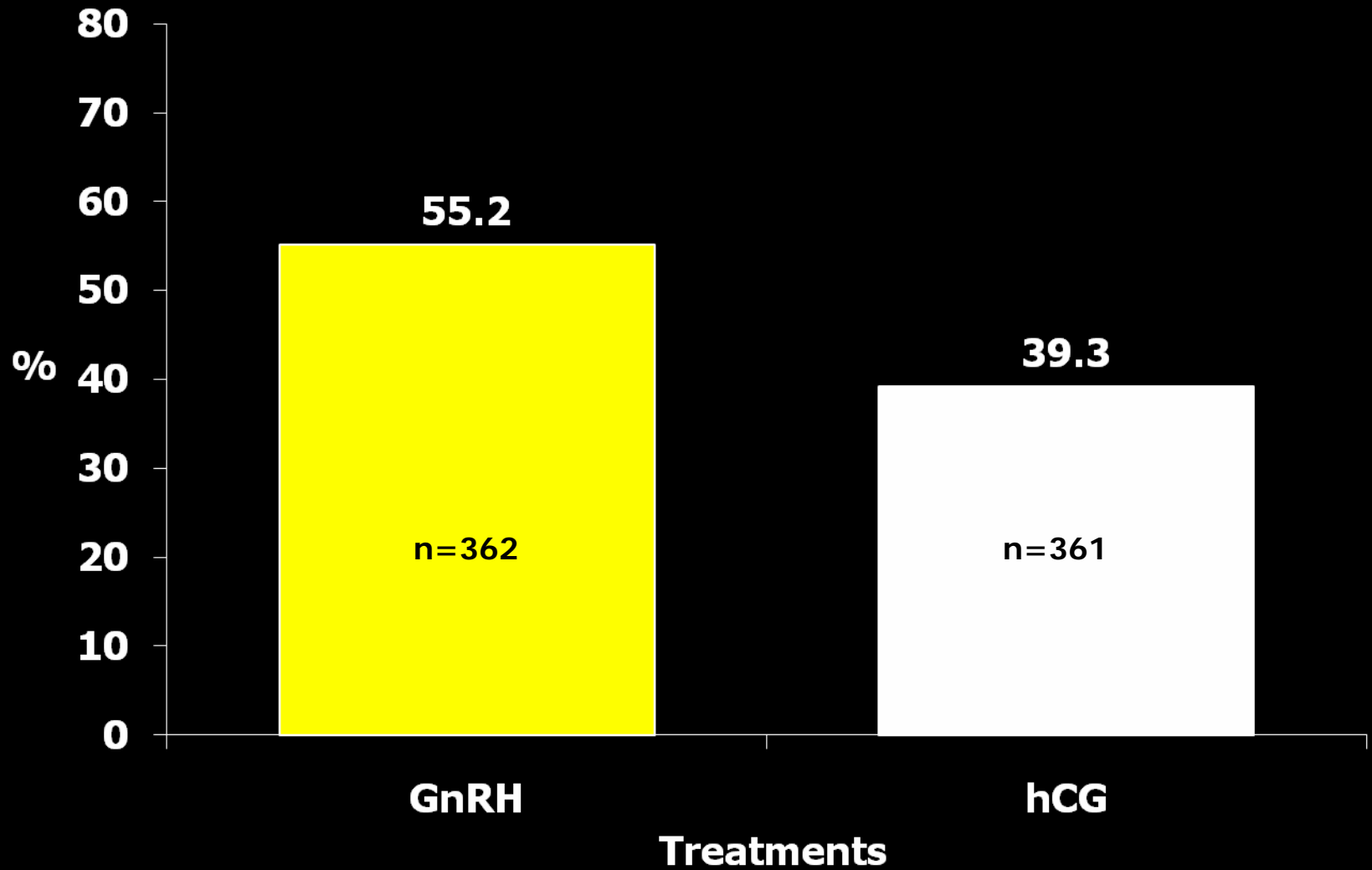
Pregnancy rate to TAI



Use of hCG at TAI in the CO-Synch + CIDR protocol



Pregnancy rate to TAI



Summary of estrus synchronization systems for cows

- ➡ Fixed-time AI systems are effective
- ➡ Progesterone induces estrous cyclicity in noncycling cows
- ➡ The calving season is altered
- ➡ Factors that can alter fertility are:
 - Body condition score
 - Cycling vs. noncycling
 - Days postpartum
 - Calf removal

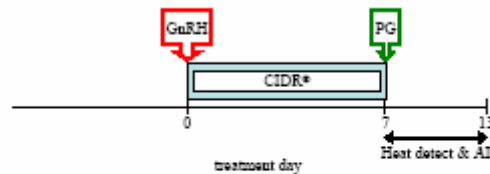
BEEF COW PROTOCOLS

HEAT DETECTION

Select Synch



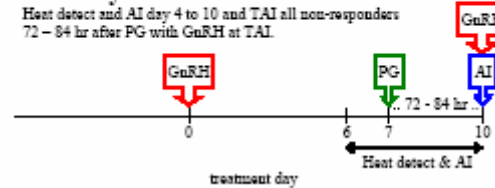
Select Synch + CIDR®



HEAT DETECT & TIME AI (TAI)

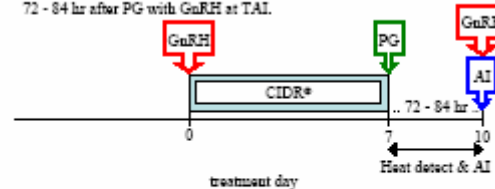
Select Synch & TAI

Heat detect and AI day 4 to 10 and TAI all non-responders
72 - 84 hr after PG with GnRH at TAI.



Select Synch + CIDR® & TAI

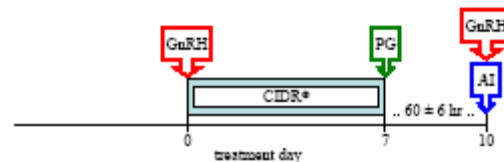
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 Estrunate®, In-Synch®, Lutalyse®, ProstaMate®,
estroPLAN®

Thank You!



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Email: gclamb@ufl.edu

Conception Rates after Altered Timing of AI Associated with the CO-Synch + CIDR Protocol

**C.A Dobbins, D.E. Tenhouse, D.R. Eborn, K.R.
Harmony, S.K. Johnson, and J.S. Stevenson**

Experimental Design

TAI 48 hr



TAI 56 hr



TAI 64 hr



TAI 72 hr

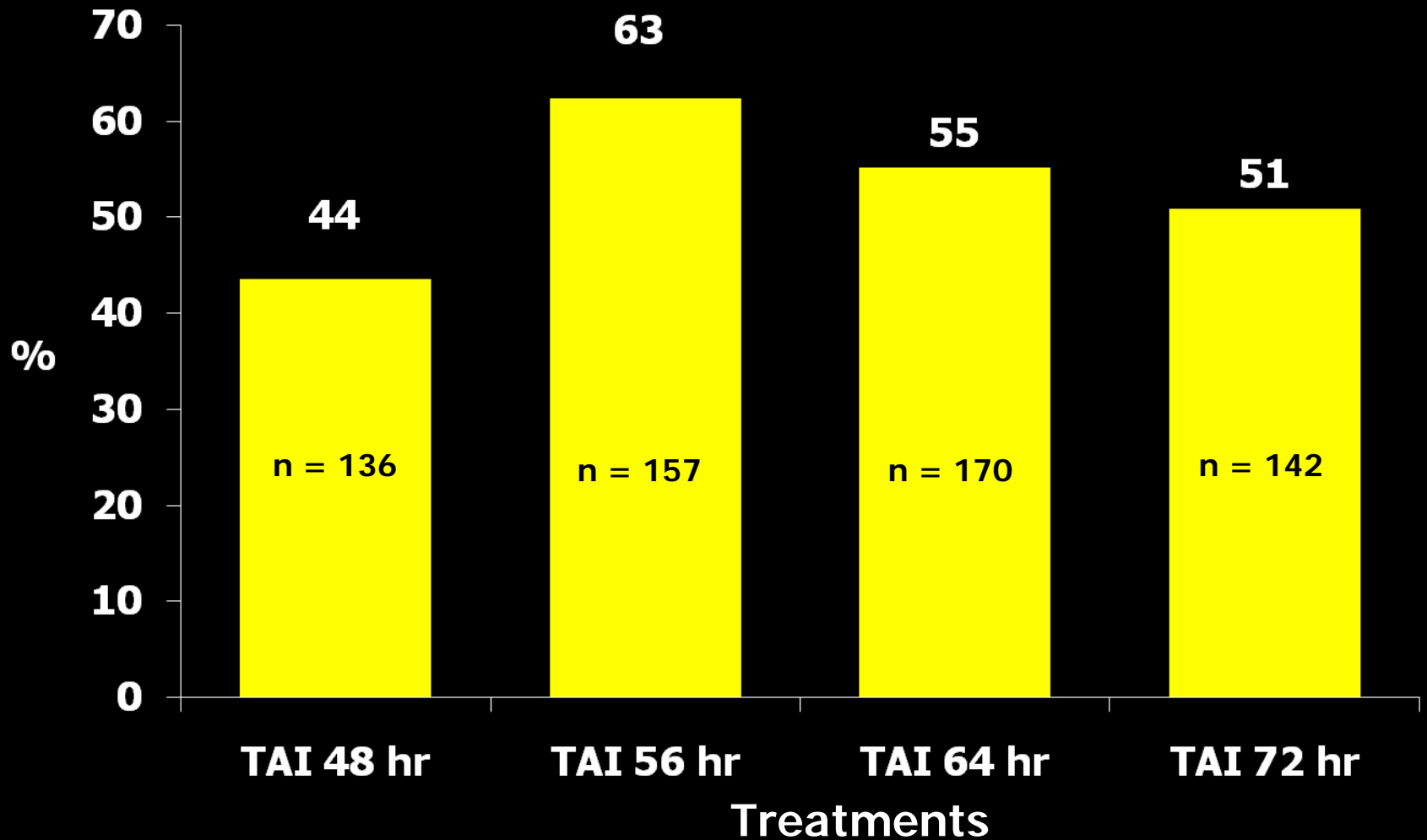


Days relative to PGF

Hours relative to PGF

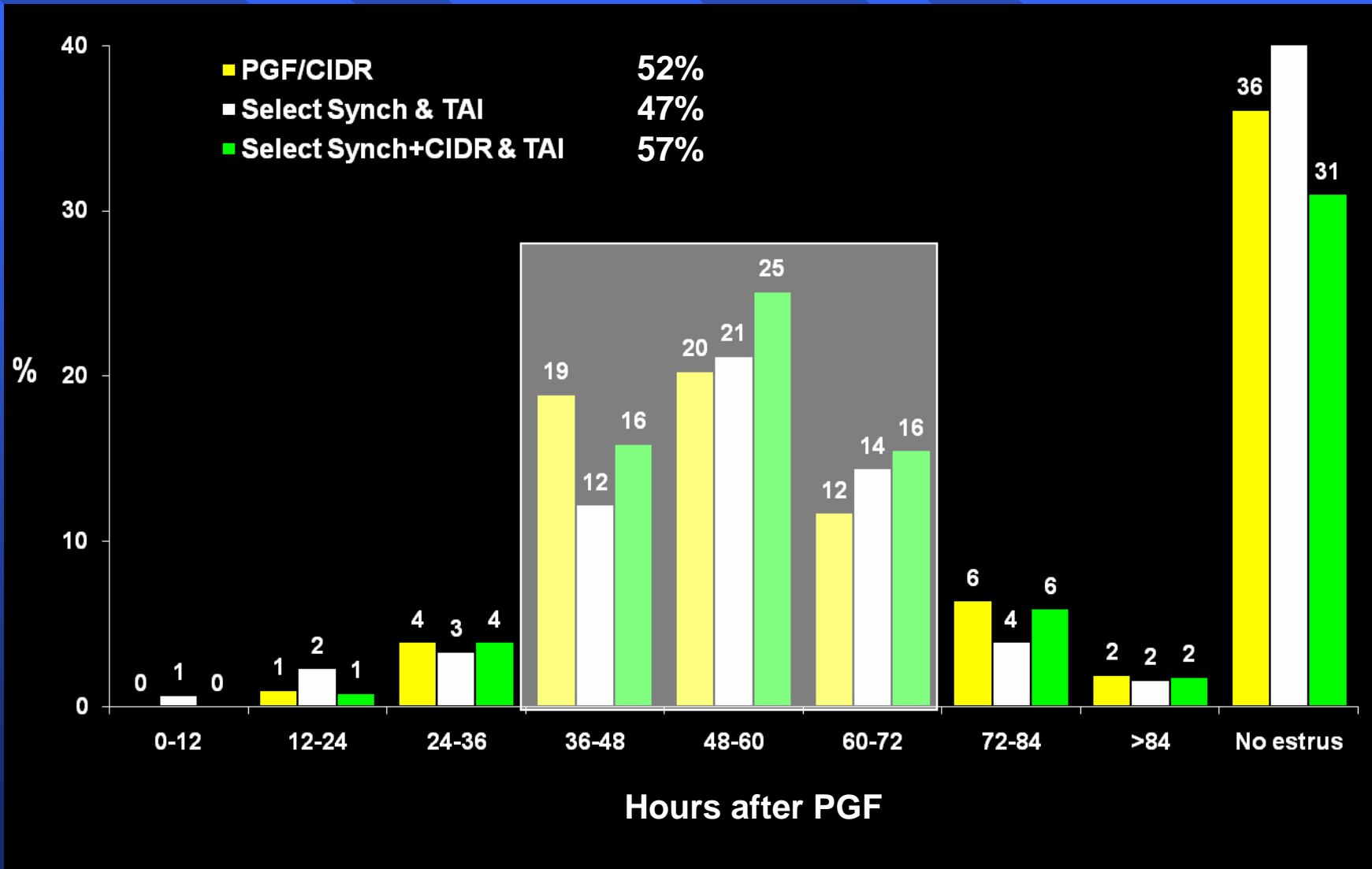


First Service Pregnancy Rates



Quadratic effect ($P < 0.01$)

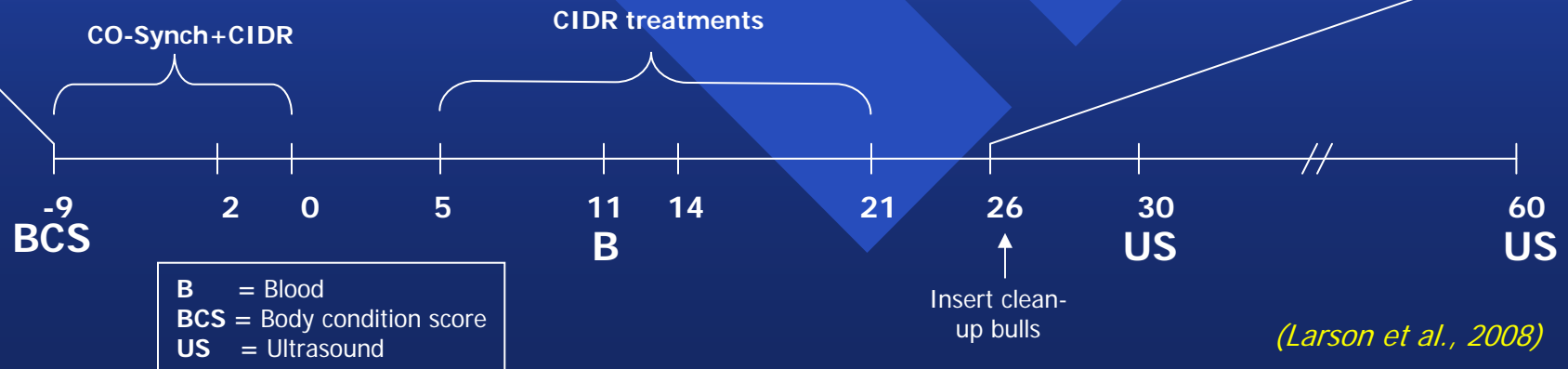
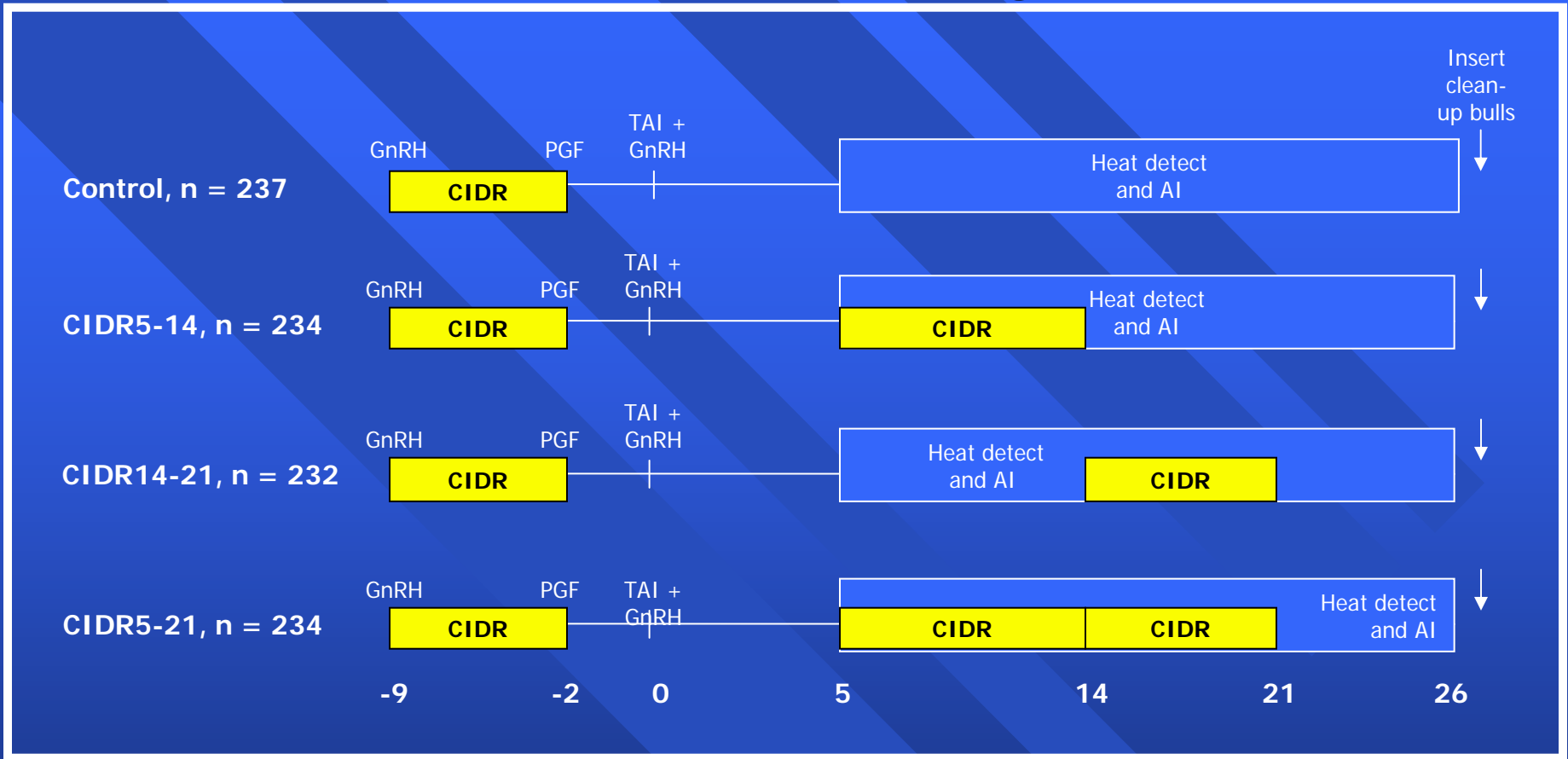
Distribution of estrus



Resynchronization of estrus after a TAI

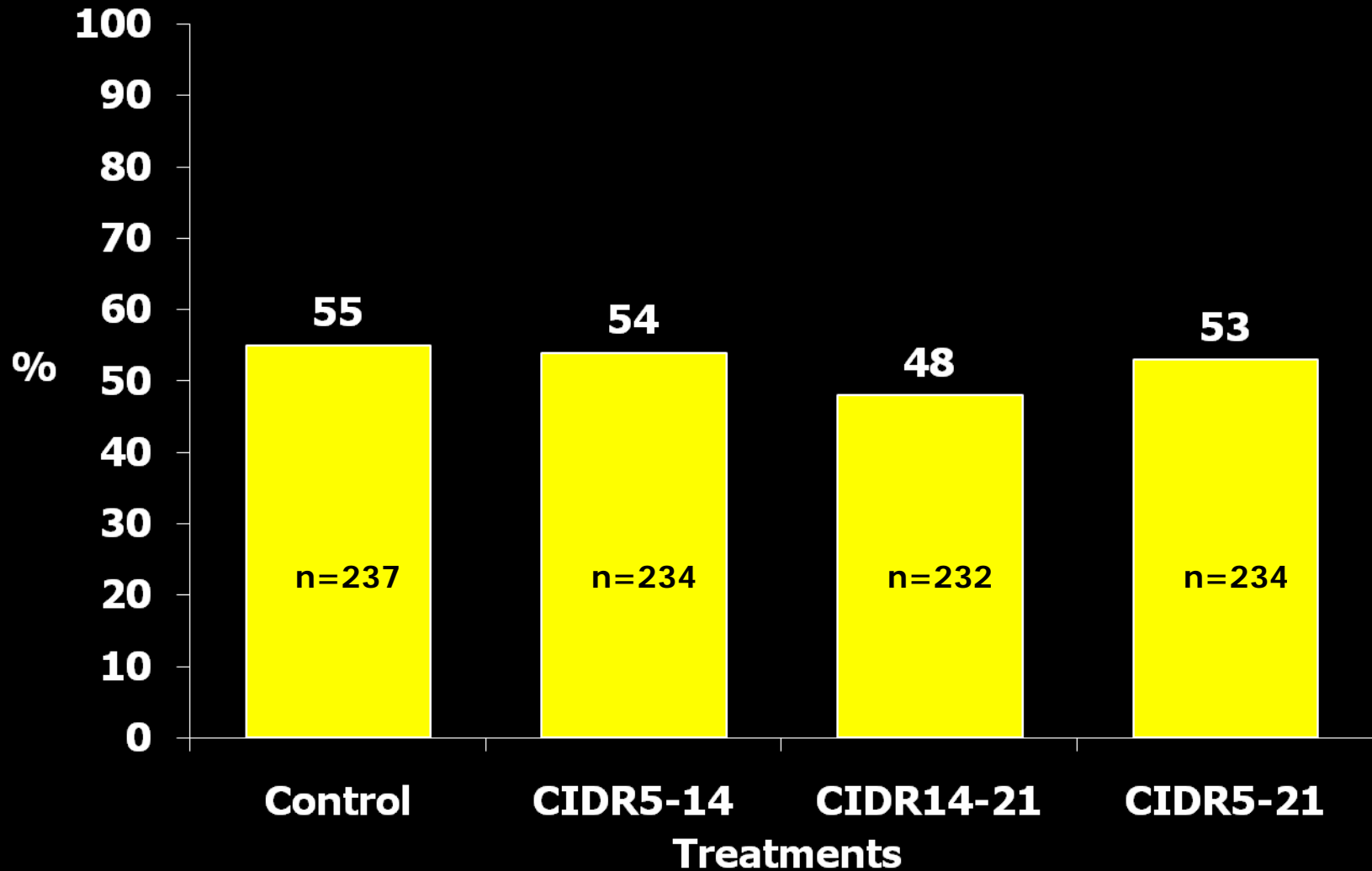


Experimental Design

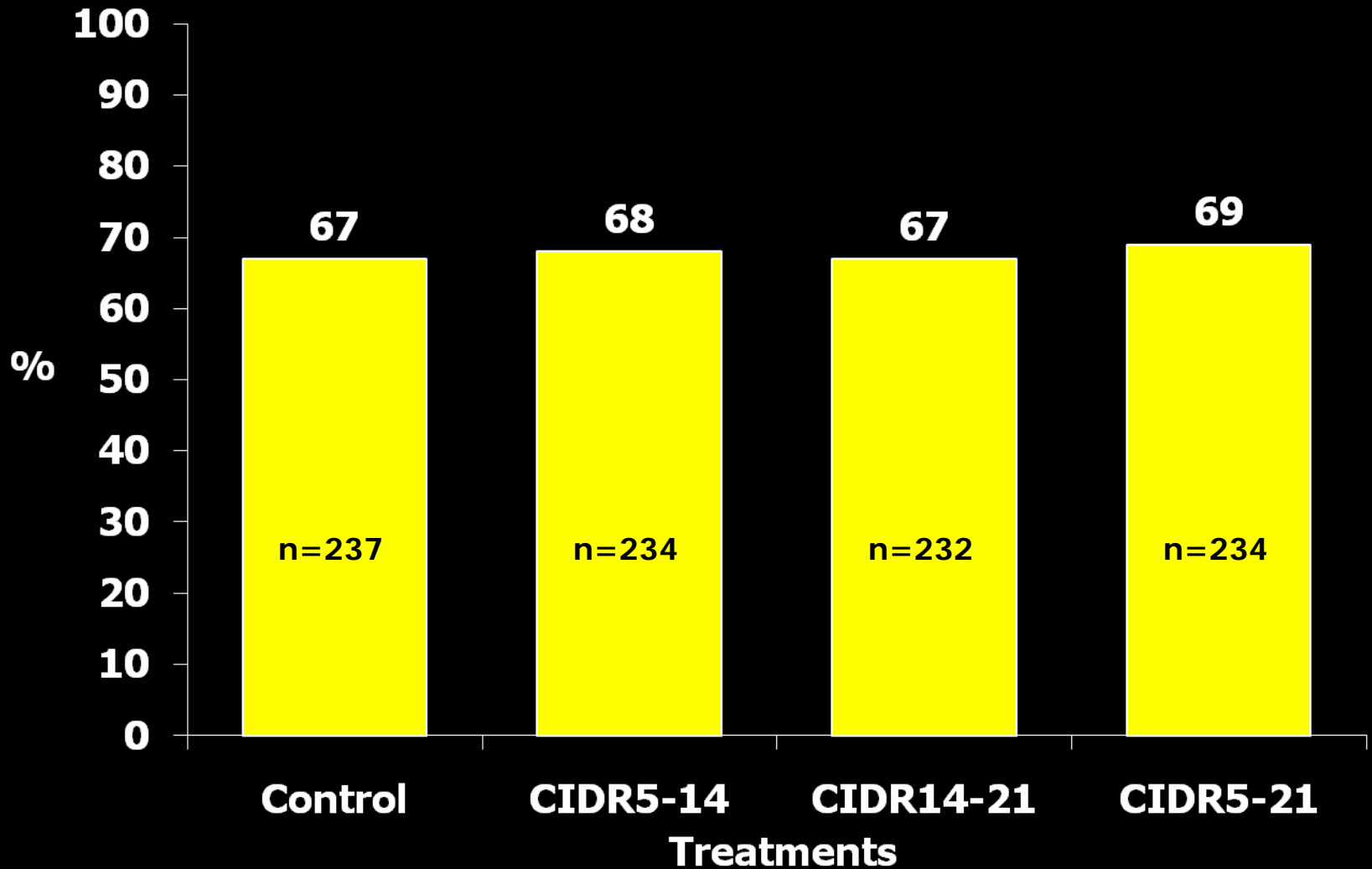


(Larson et al., 2008)

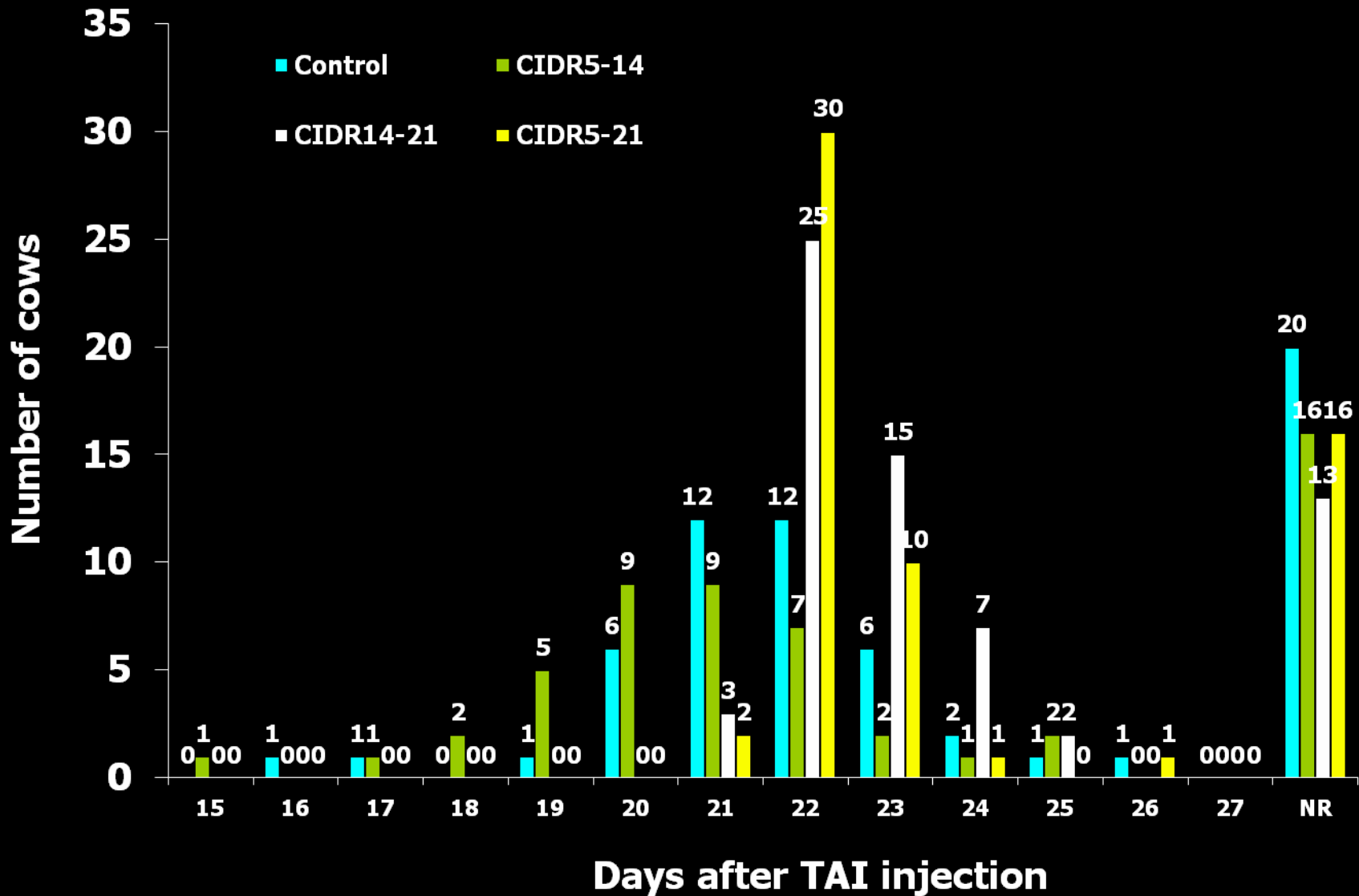
30 Day Pregnancy Rates to Initial TAI



60 Day Pregnancy Rates to Initial TAI



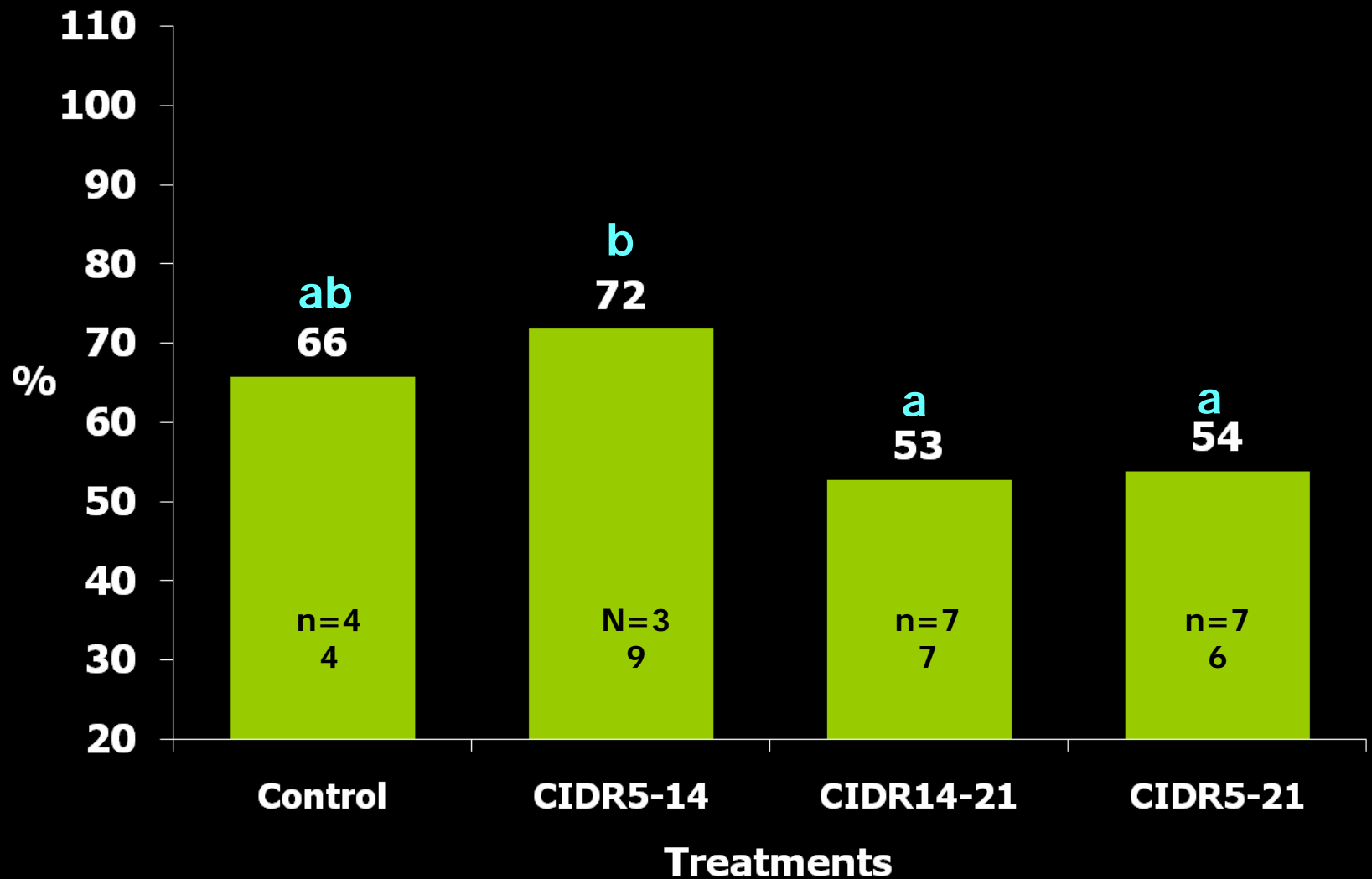
Estrus Distribution of Return Estrus



Estrus Response Characteristics of Nonpregnant Cows Resynchronized after TAI

Item	Treatments			
	Control	CIDR5-14	CIDR14-21	CIDR5-21
No. of nonpregnant cows	106	109	119	109
No. of cows exhibiting estrus	44	39	77	76
% in estrus	42	36	65	70

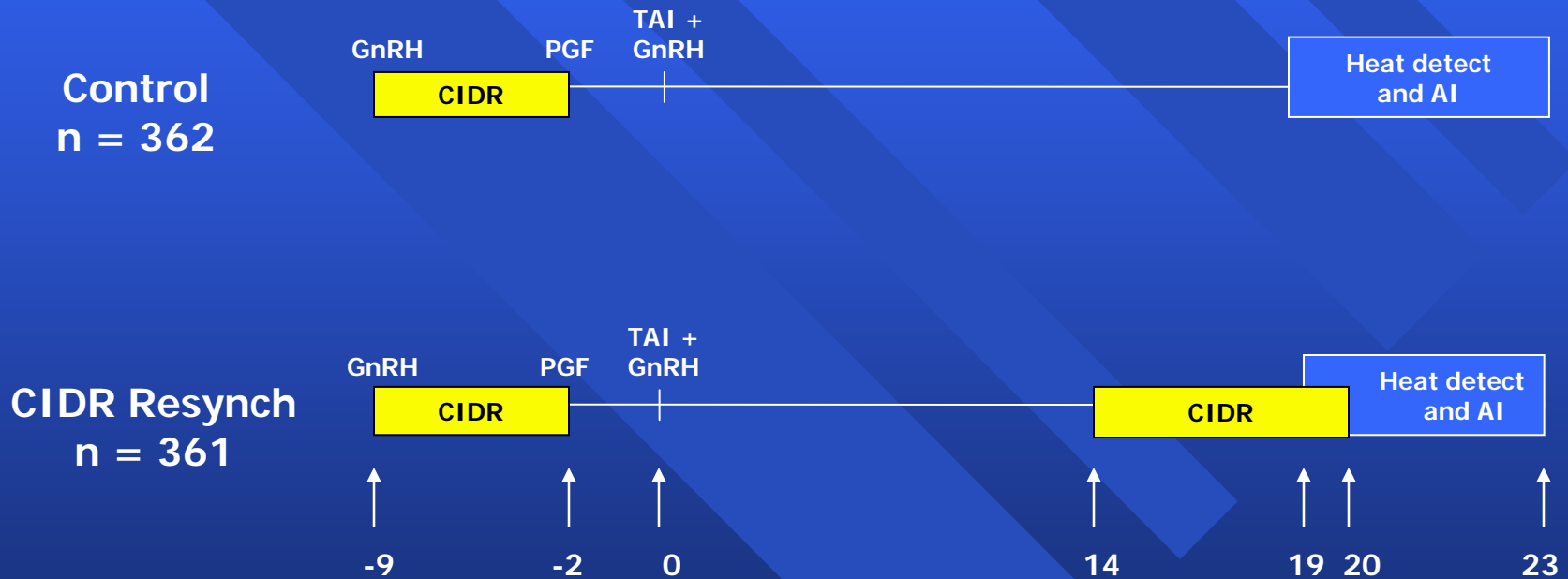
Conception Rates of Nonpregnant Cows Exhibiting Estrus



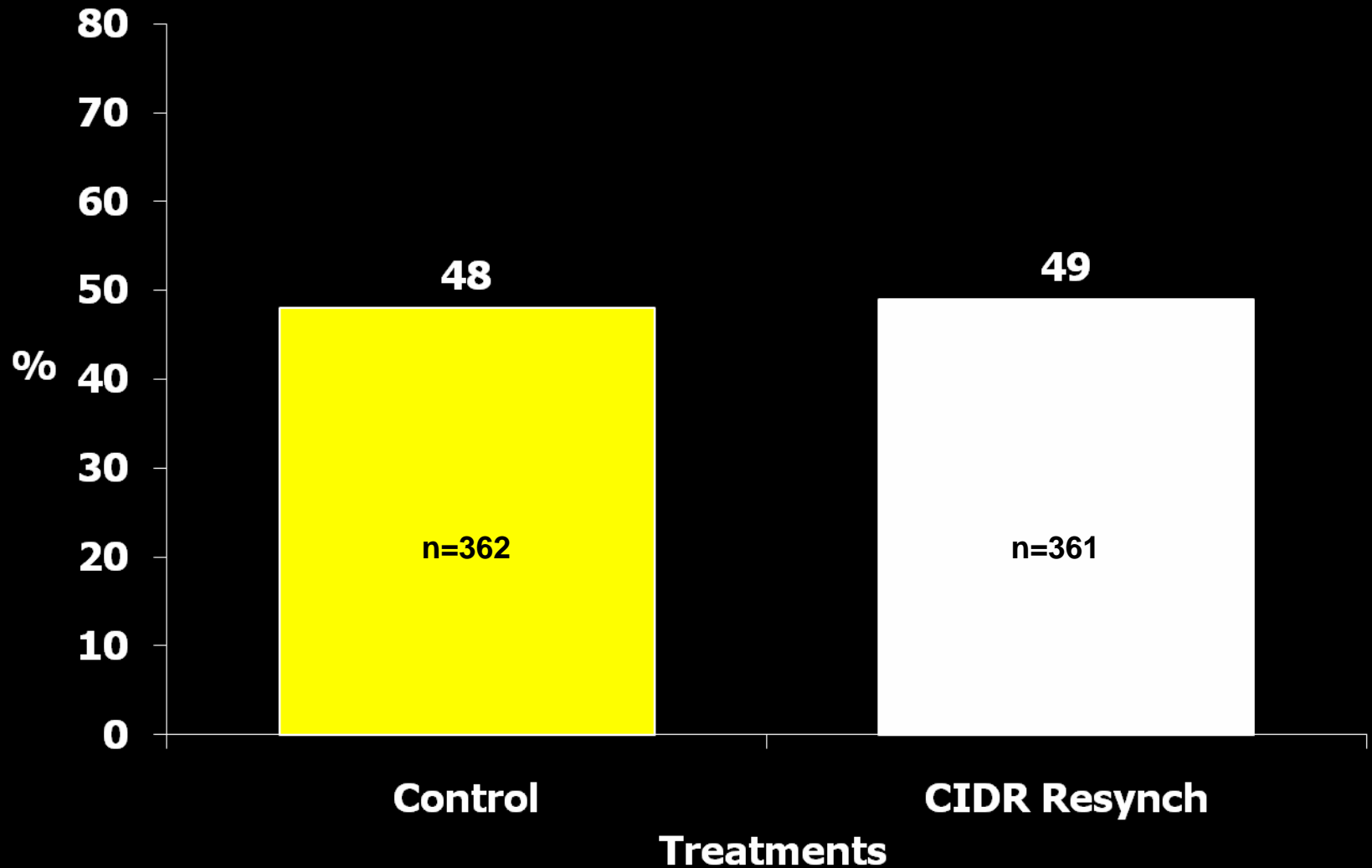
Treatment Effect $P < 0.05$

(Thielen et al., 2007)

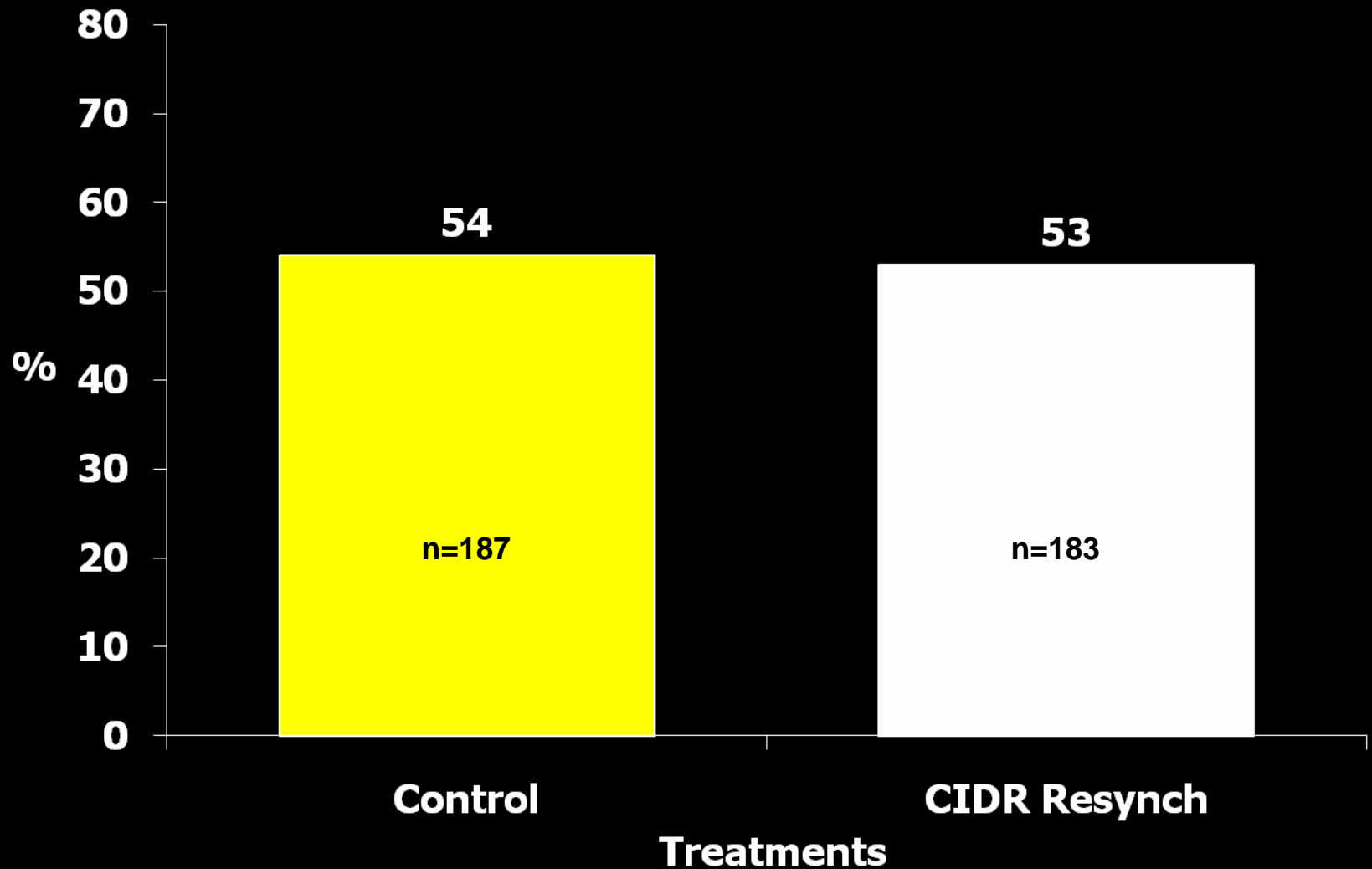
Resynchronization between 14 and 20 days after TAI



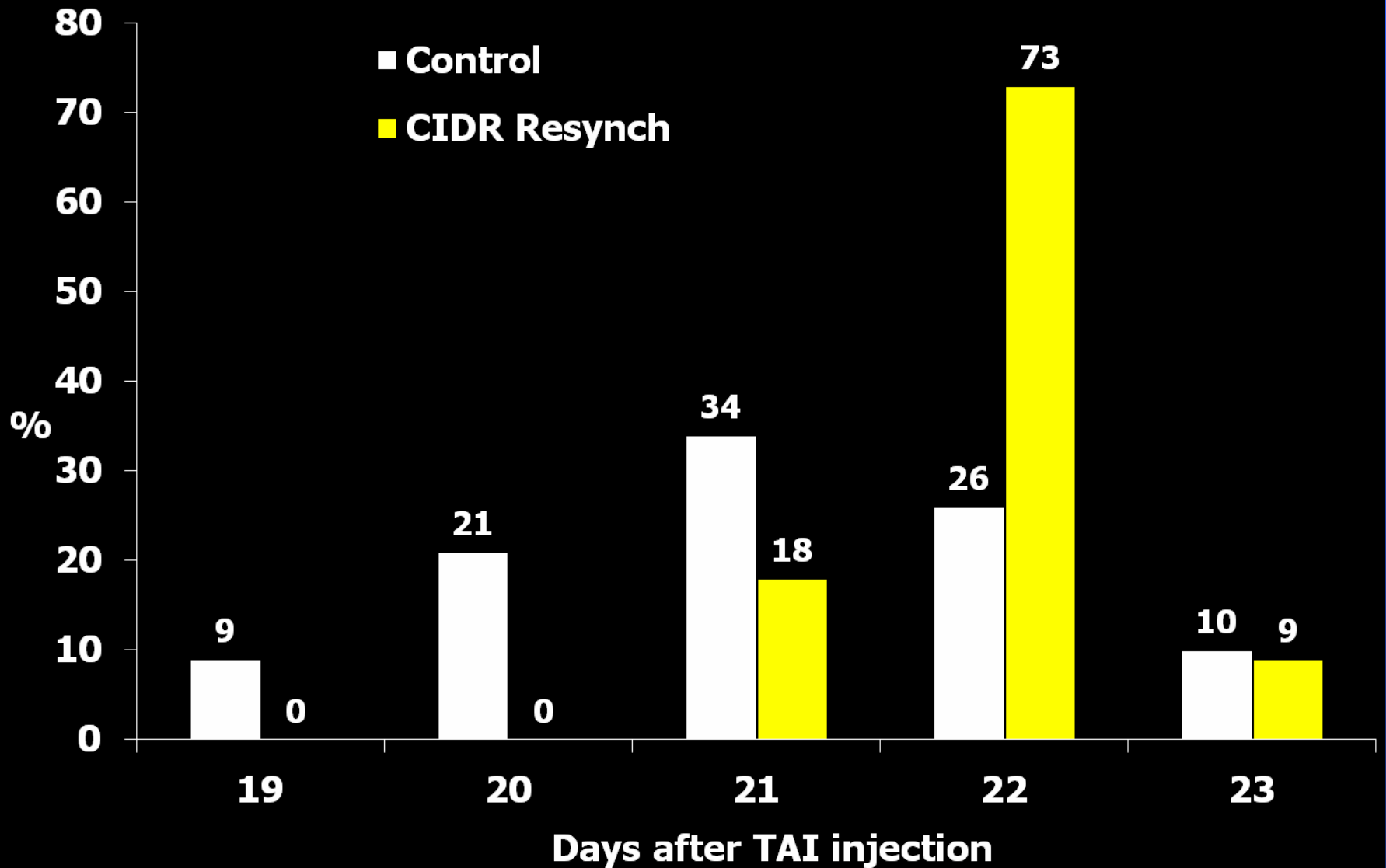
Pregnancy rate to 1st TAI



Return to estrus rate



Estrus Distribution of Return Estrus



Conception rate to 2nd AI

