Is synchronization here to stay or will new technologies soon rule the day?

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Western Canadian Dairy Seminar
Red Deer, Mar 2015

The rules

Share your experiences & opinions

- Different repro management options
- Technologies
- Genetics

Question 1

How do you manage cows for first AI?

- Visual obs?
- Timed AI?
- Automated systems?
- Combination?

1. Synchronisation

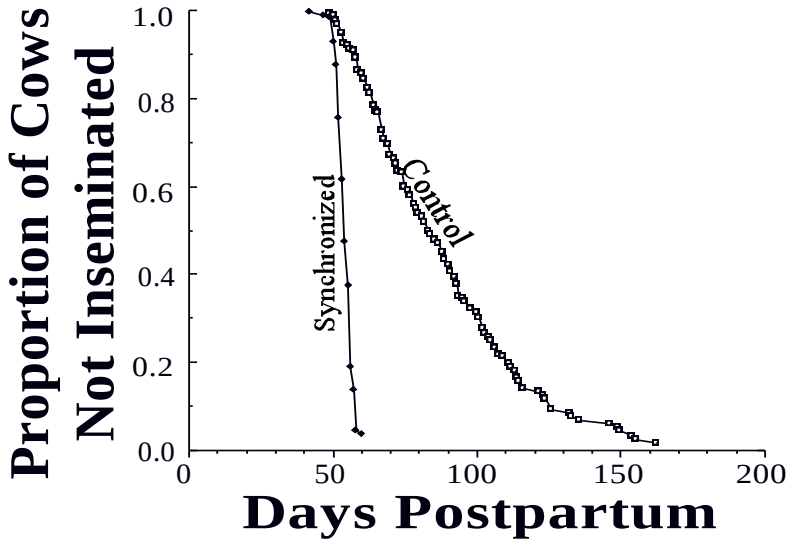
Some facts

- Synch hormones available
  - P4
  - Prostaglandin F2a
  - GnRH
  - eCG/PMSG
  - hCG
- High fertility protocols for FTAI have been developed
  - Synchronisation
  - Resynchronisation

Synchronization of Ovulation

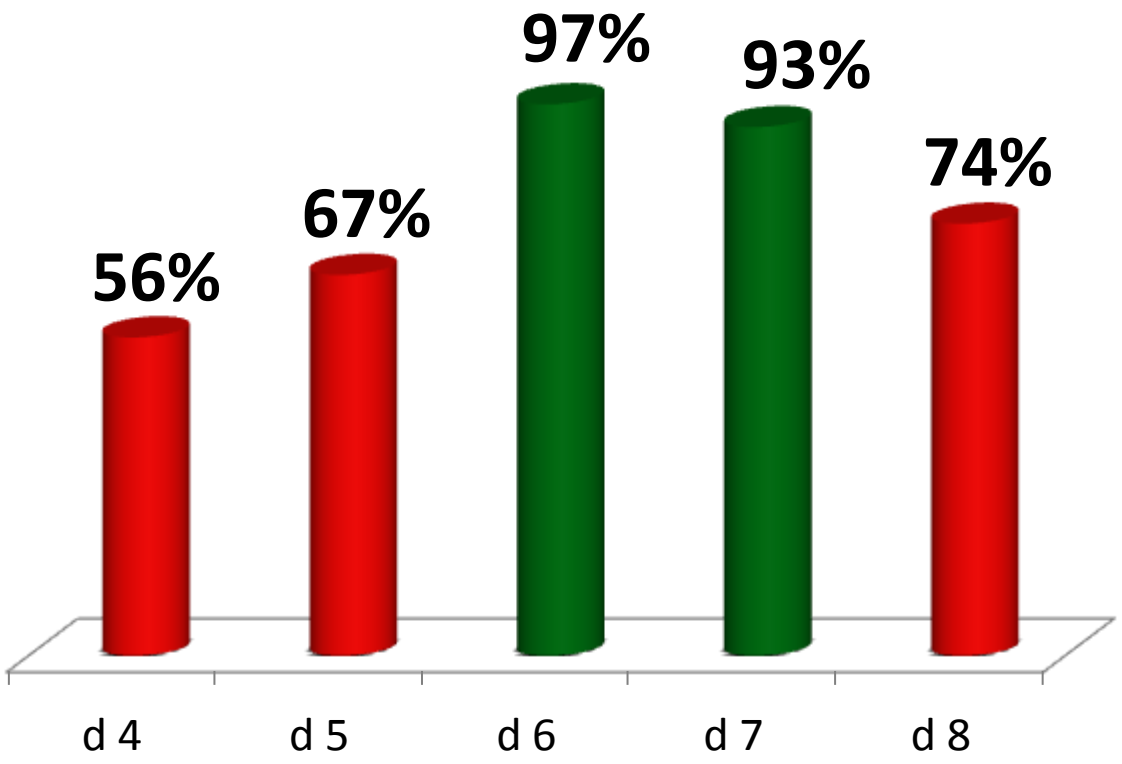
Ovsynch

GnRH — 7 d — PGF_{2a} — 56 h — GnRH — 16 h — AI

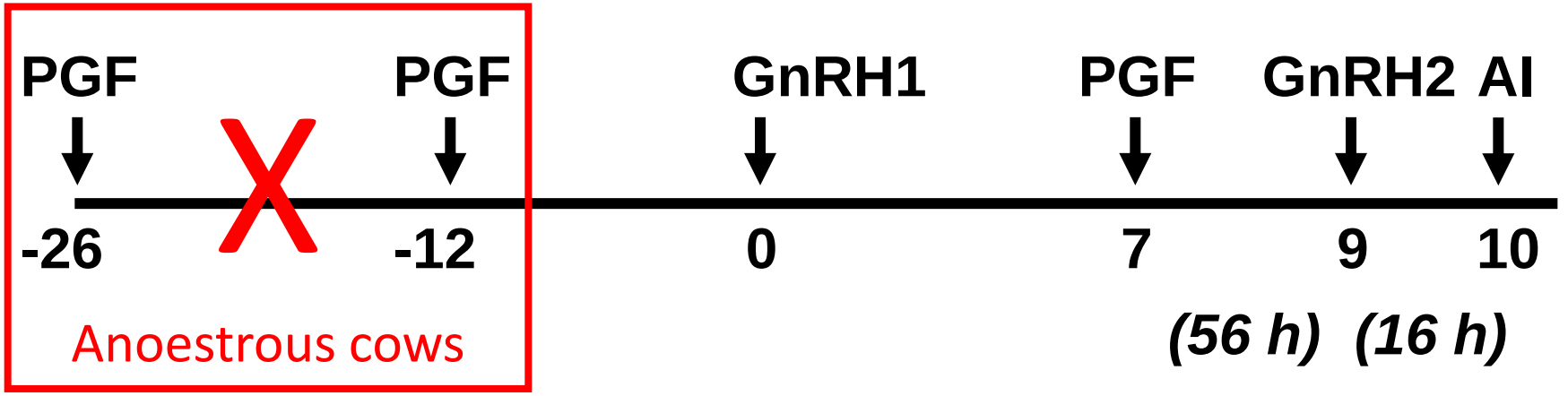


Pursley et al., 1995

Ovulation (%) to GnRH1



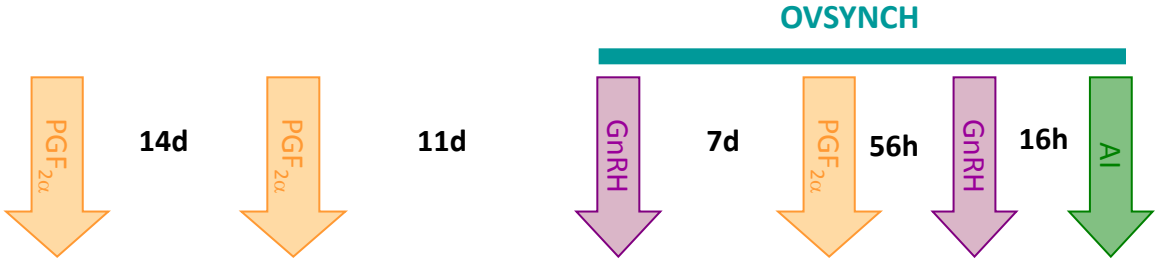
Synchronization of Follicular Waves: PRESYNCH-OVSYNCH



Moreira et al., 2001

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				PGF		
				PGF		
	GnRH					
	PGF		GnRH	TAI		

Presynch-11



vs.

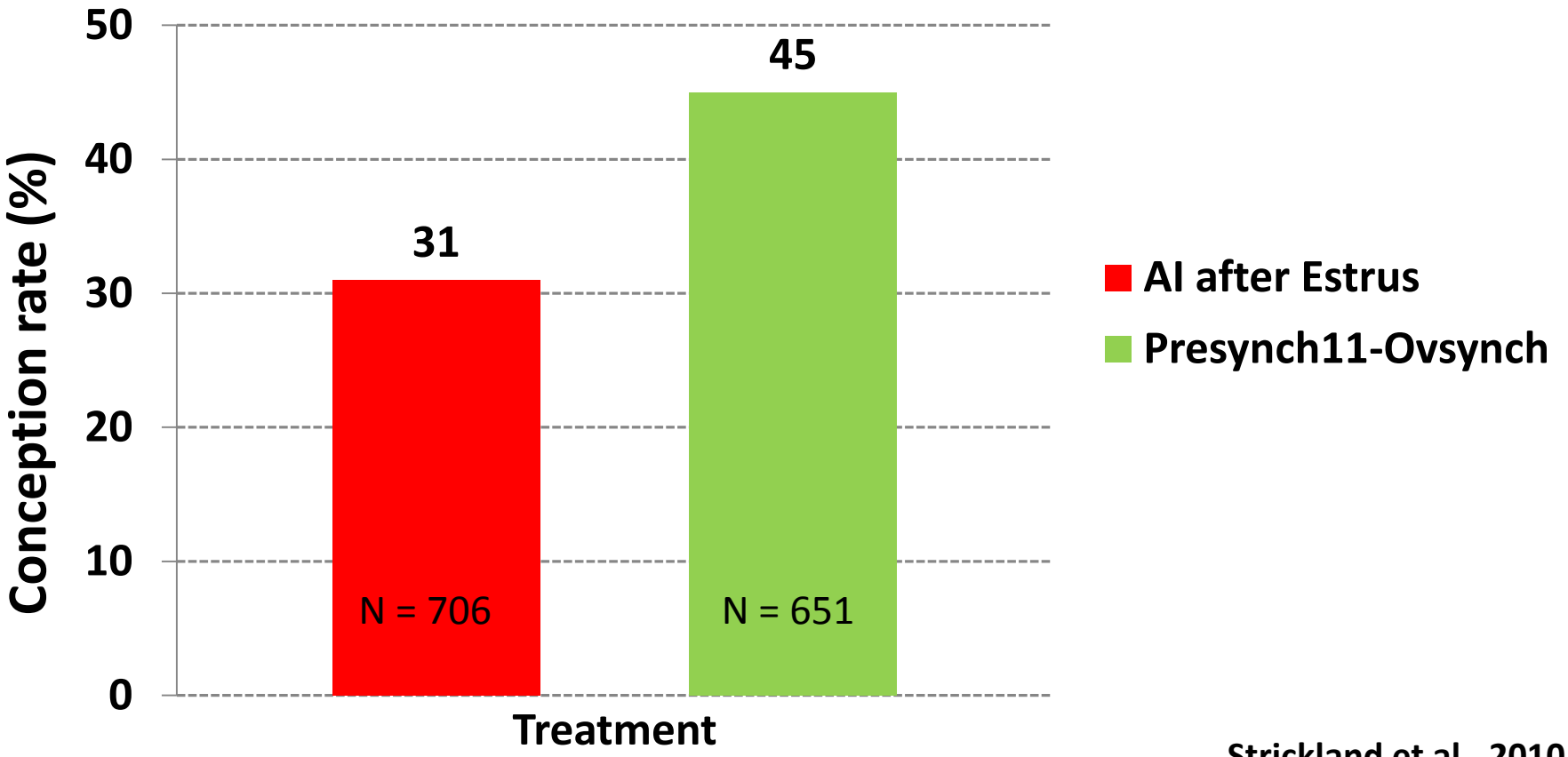
Standing Estrus

n = 1357 lactating dairy cows

1st AI

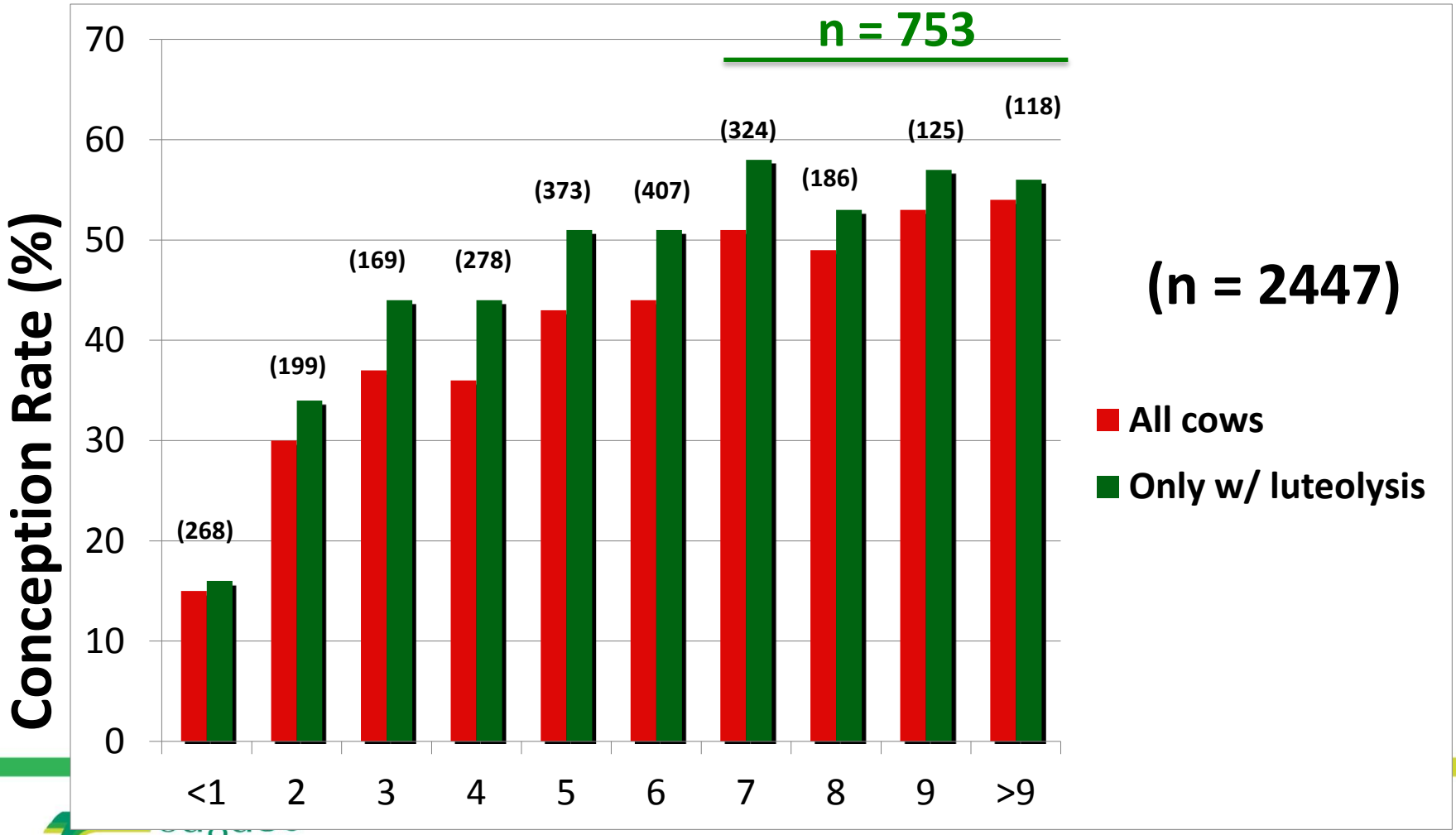
Strickland et al., 2010

1st AI conception rate in estrus vs. Presynch-11/Ovsynch

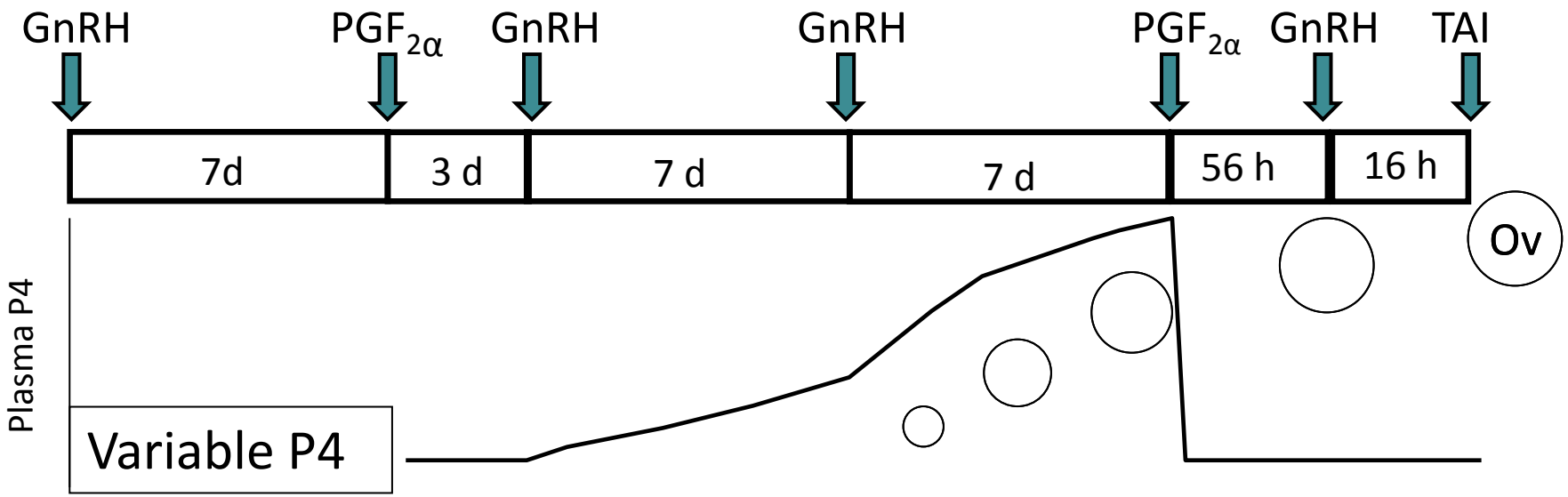


Strickland et al., 2010

Relationship of Progesterone on d of PGF of Ovsynch on Fertility of Lactating Dairy Cows

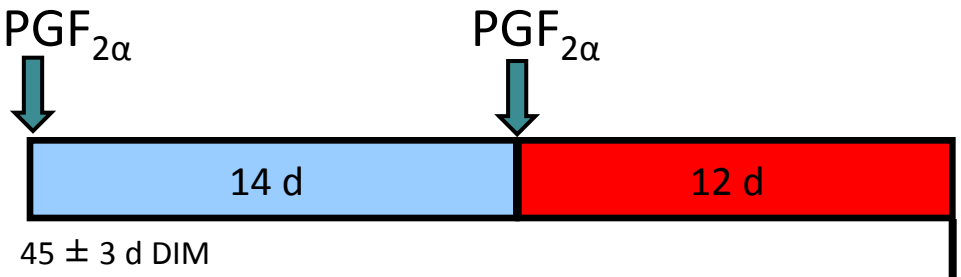


Double-Ovsynch (high pre-breeding P4)

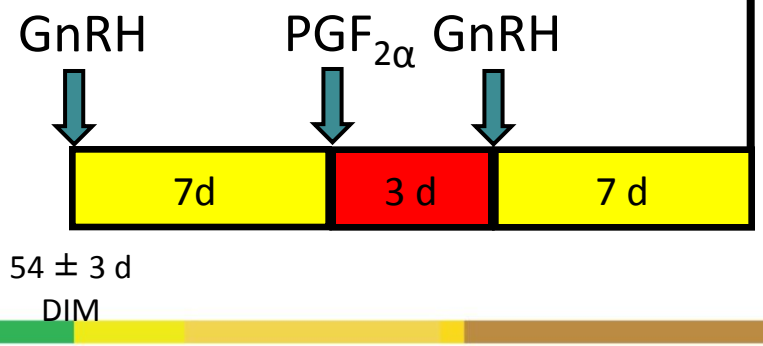


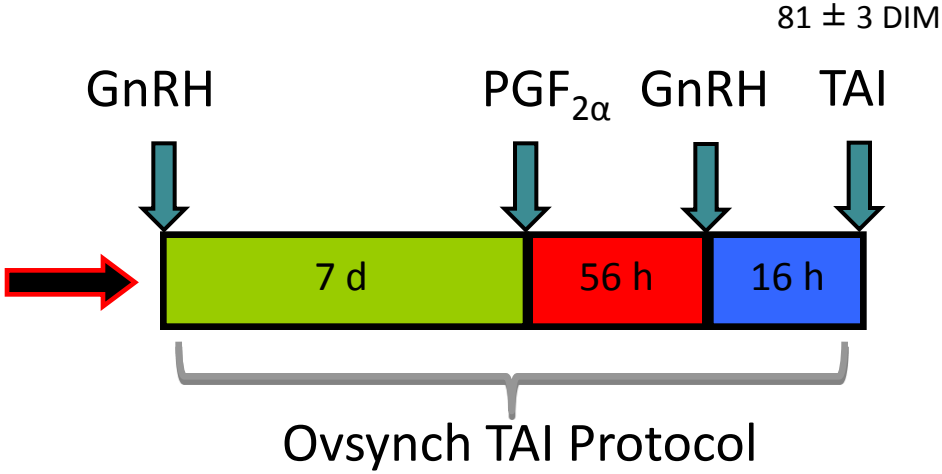
Sun	Mon	Tue	Wed	Thu	Fri	Sat
					GnRH	
					PGF	
	GnRH					
	GnRH					
	PGF		GnRH	TAI		

Presynch-Ovsynch (PS, *n* = 850)



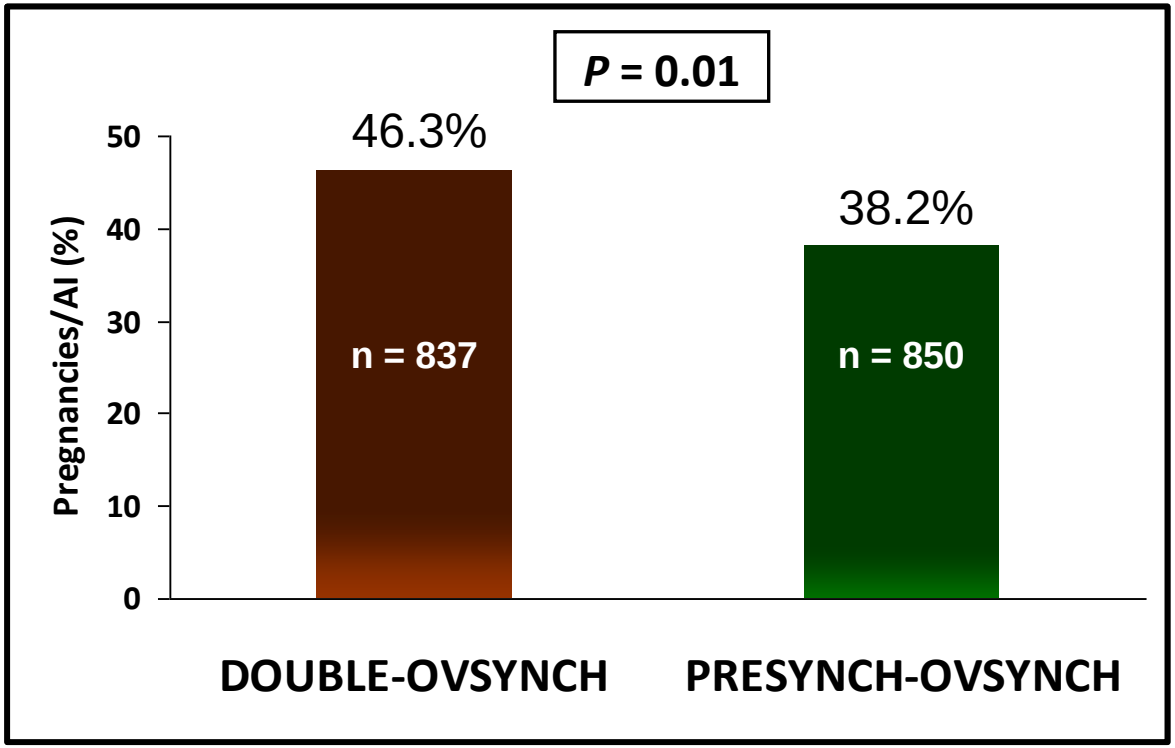
Double-Ovsynch (DO, *n* = 837)





Herlihy et al., (2012)

Pregnancies per AI and Embryo Loss after first PP TAI



	DO	PS	*P*-value
Late Embryo Loss (%)	8.5	5.5	0.3

Herlihy et al., (2012)

Pregnancies per AI after first PP TAI

Parity

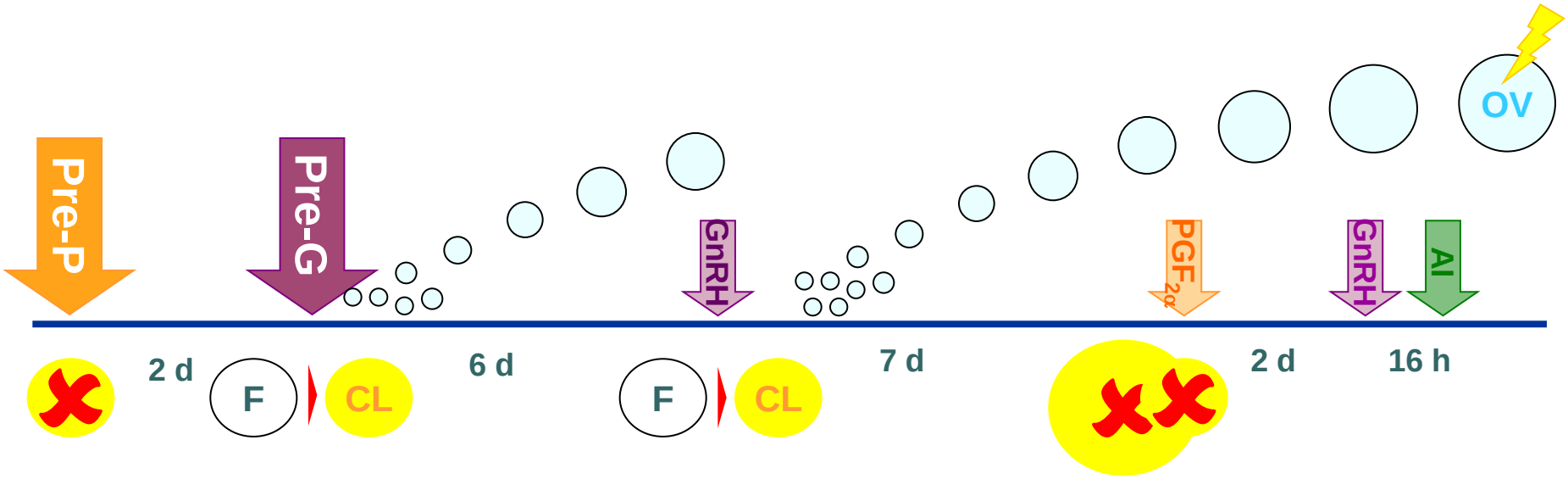
Pregnancies per AI	Double-Ovsynch	Presynch-Ovsynch	*P*-value
Primiparous (%)	52.5	42.3	0.02
Multiparous (%)	40.3	34.3	0.07

BCS

Pregnancies per AI	Double-Ovsynch	Presynch-Ovsynch	*P*-value
High (%)	49.8	43.5	0.05
Low (%)	42.9	33.3	0.04

Herlihy et al., (2012)

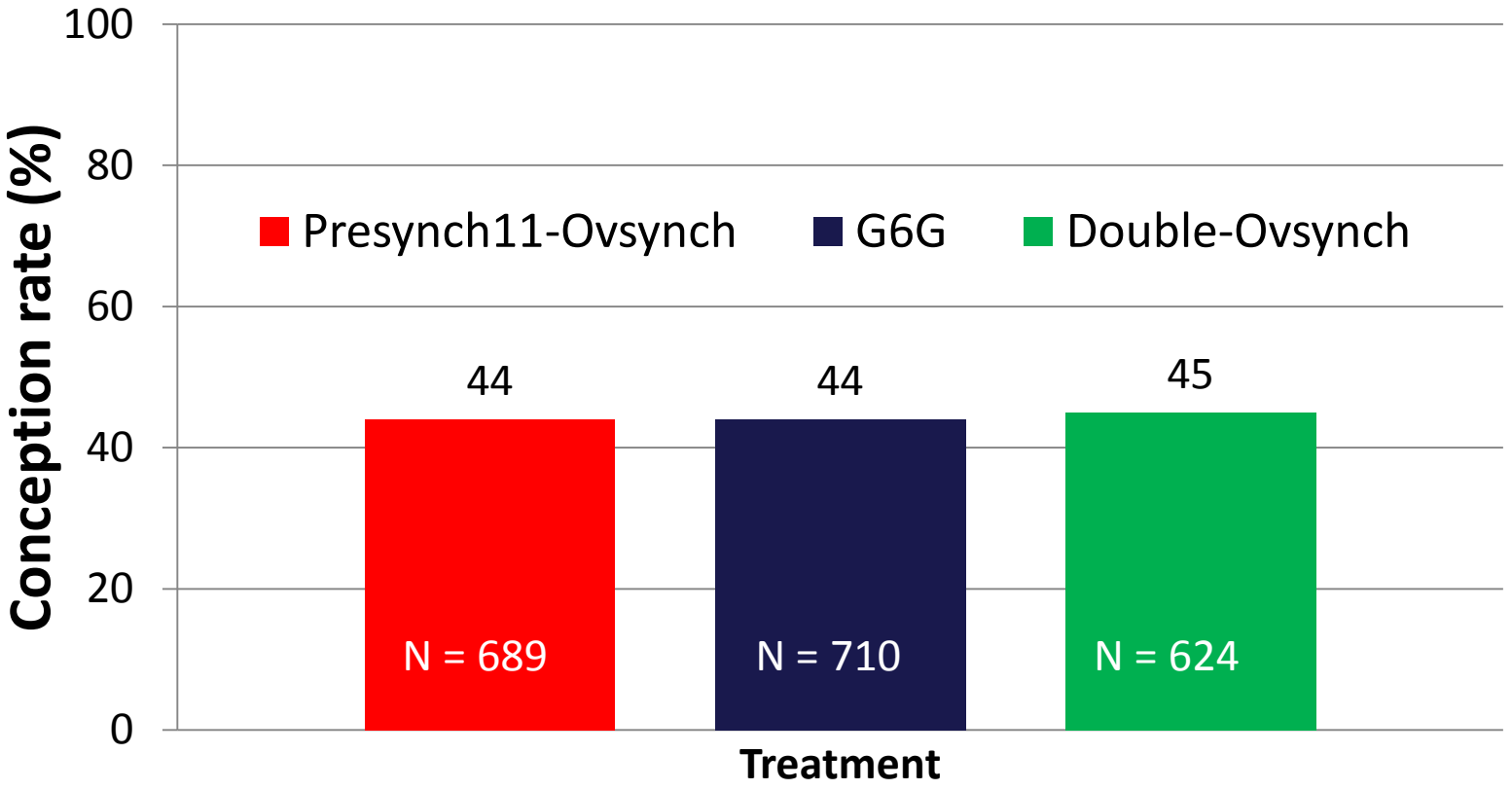
G6G (high pre-breeding P4)



Slide Courtesy of R.J. Pursley

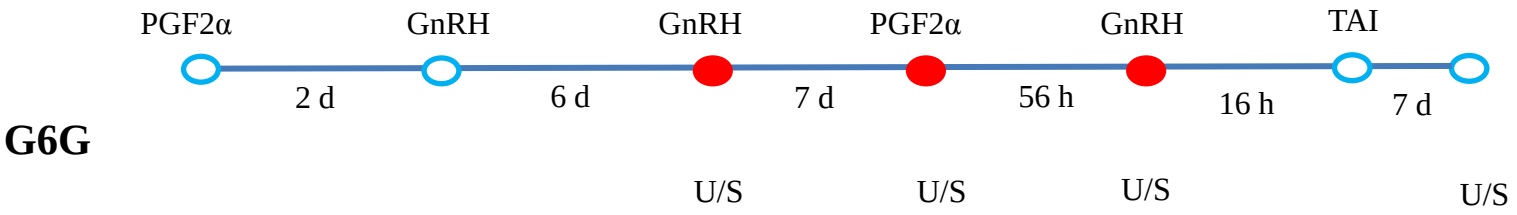
Sun	Mon	Tue	Wed	Thu	Fri	Sat
	PGF		GnRH			
		GnRH				
		PGF		GnRH	TAI	

Conception rates with different programmes

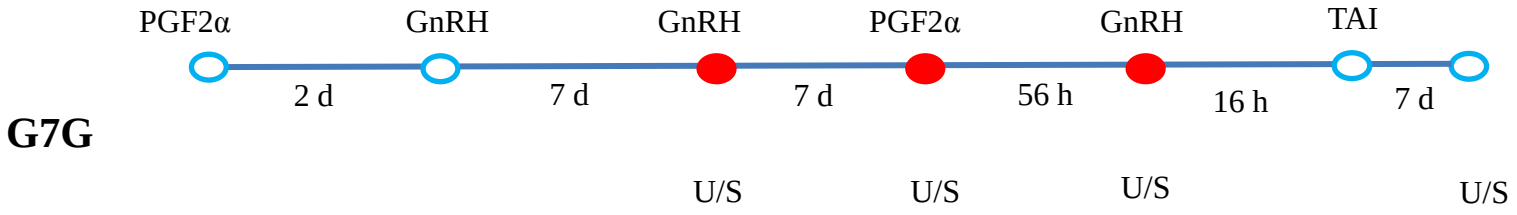


Data from R.J. Pursley

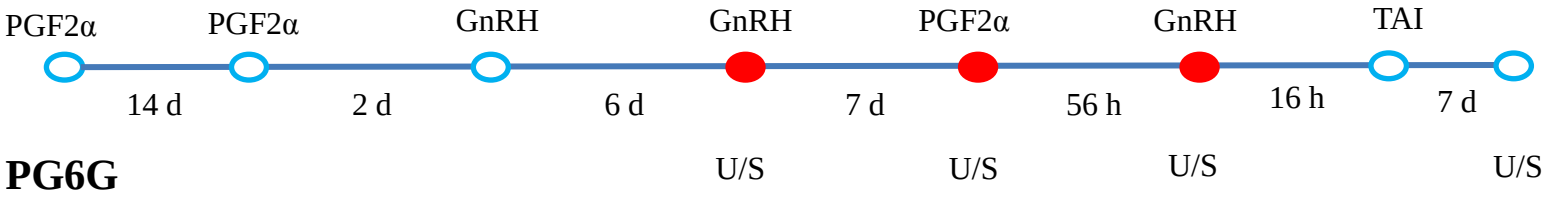
TAI PROTOCOLS



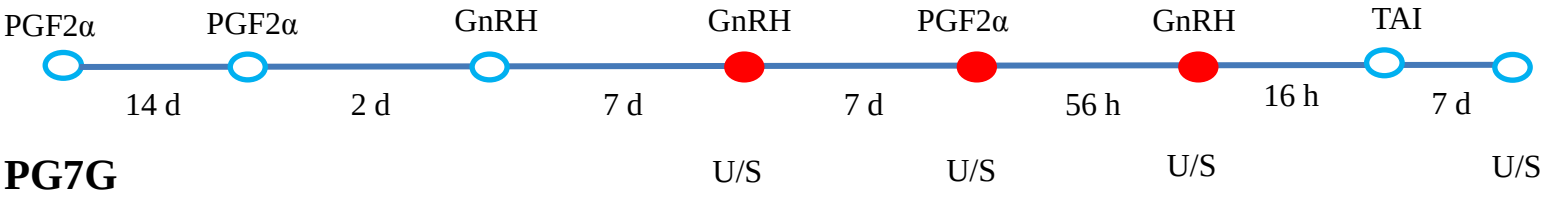
G6G



G7G



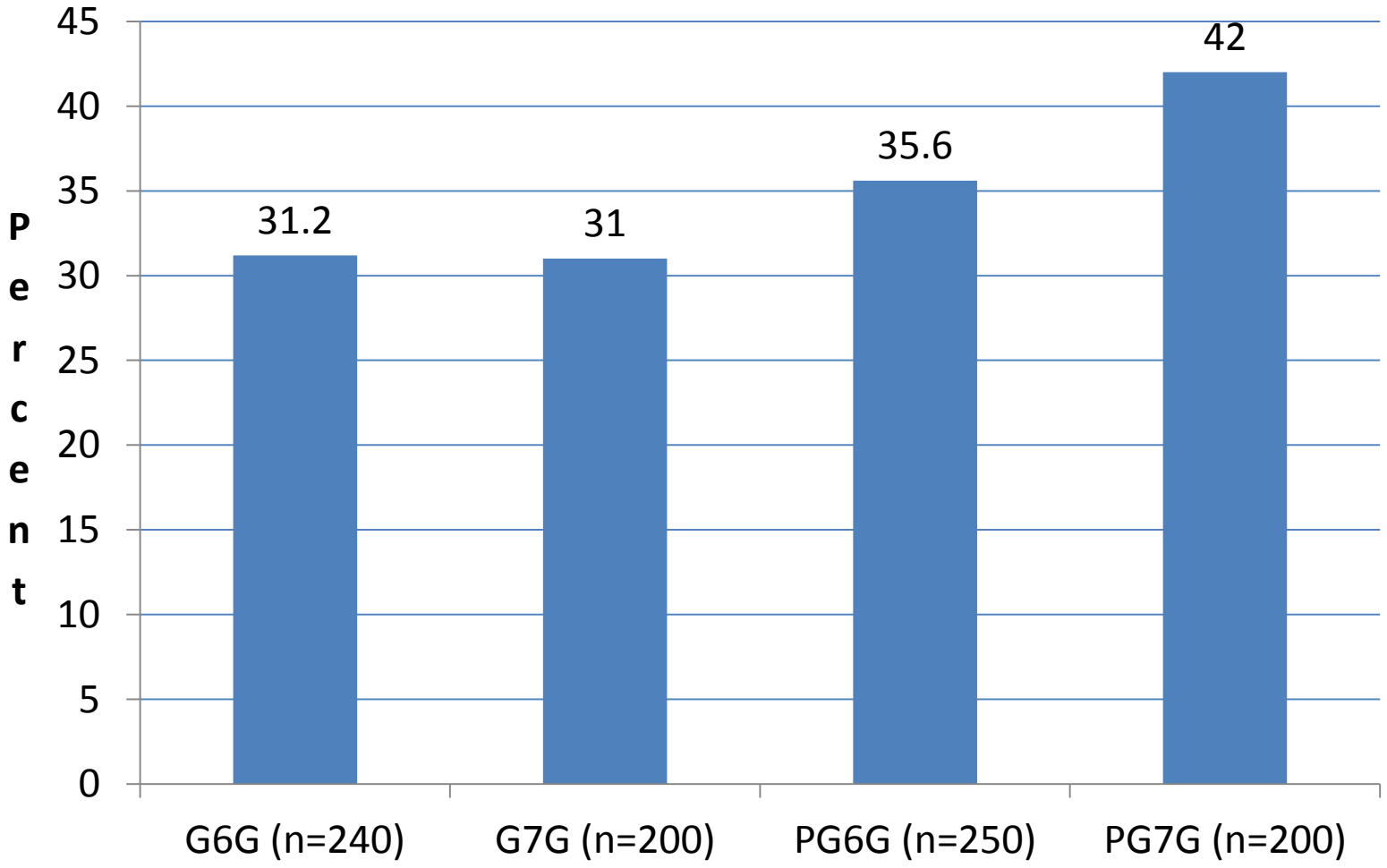
PG6G



PG7G

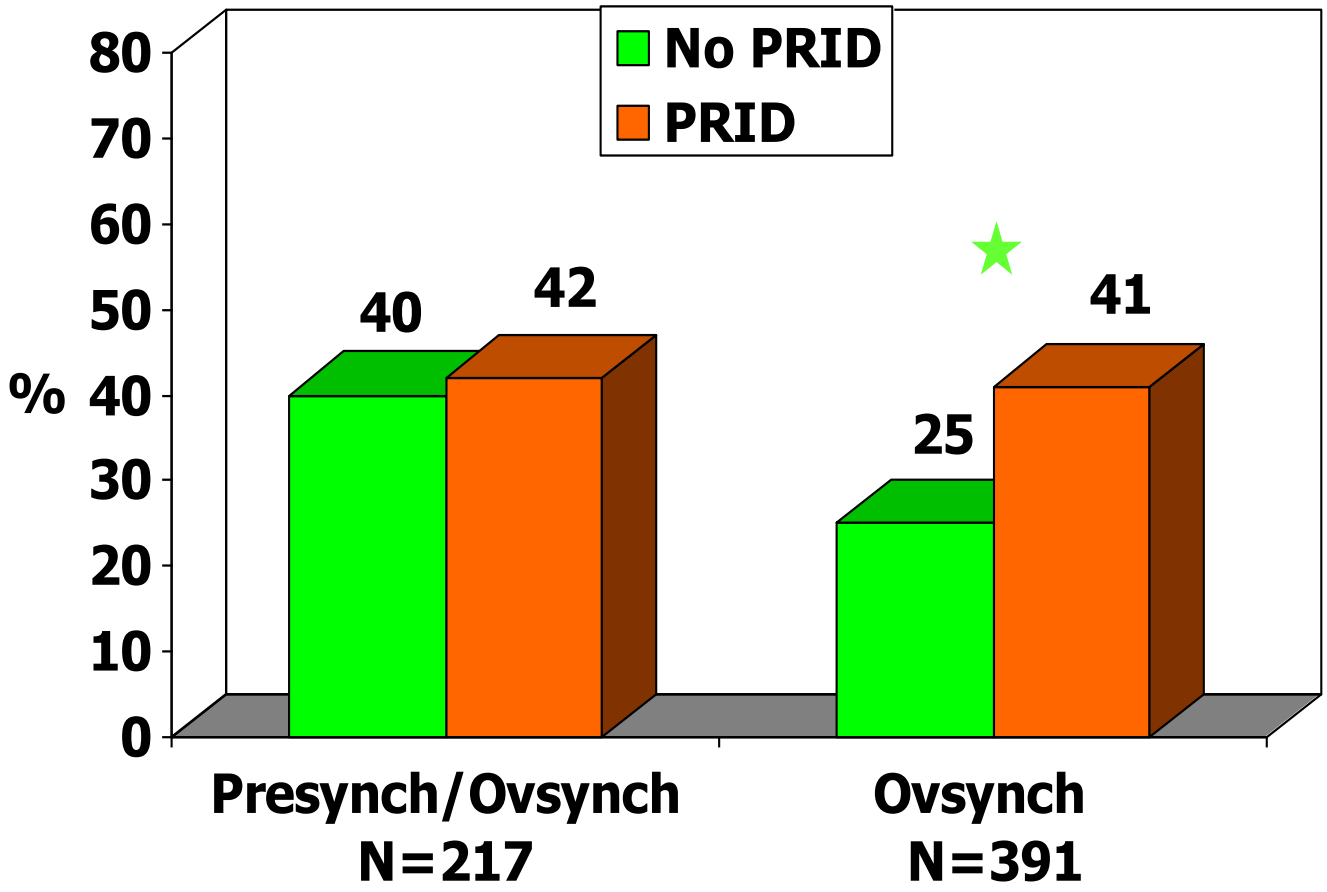
Dirandeh et al., 2015

Pregnancy rate @ 60 d



Dirandeh et al., 2015

PRID treatment by TAI protocol



Interaction P<0.05

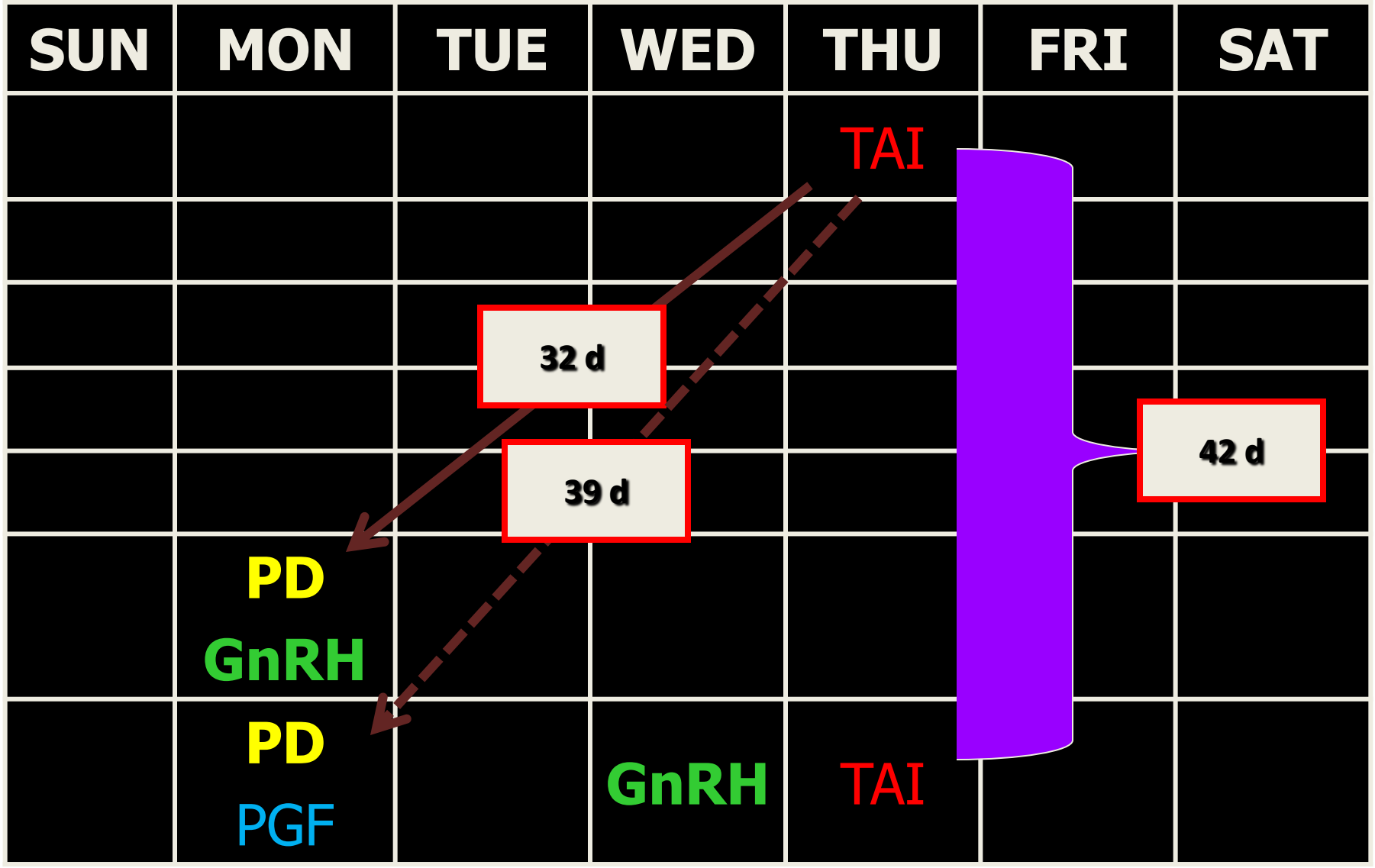
Colazo et al., 2013

Question 2

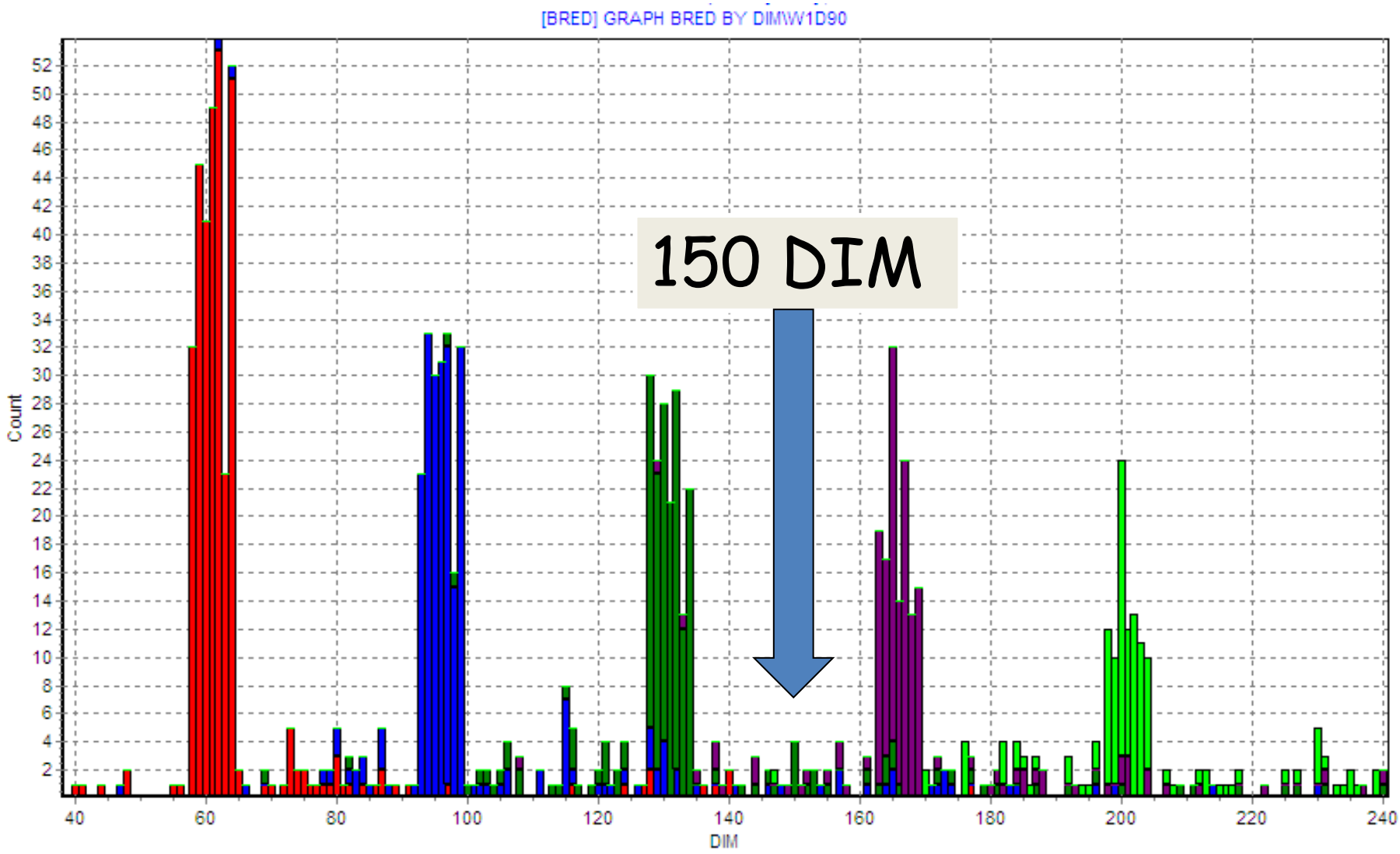
How do you manage cows for second AI?

- Visual obs?
- Timed AI?
- Automated systems?
- Combination?

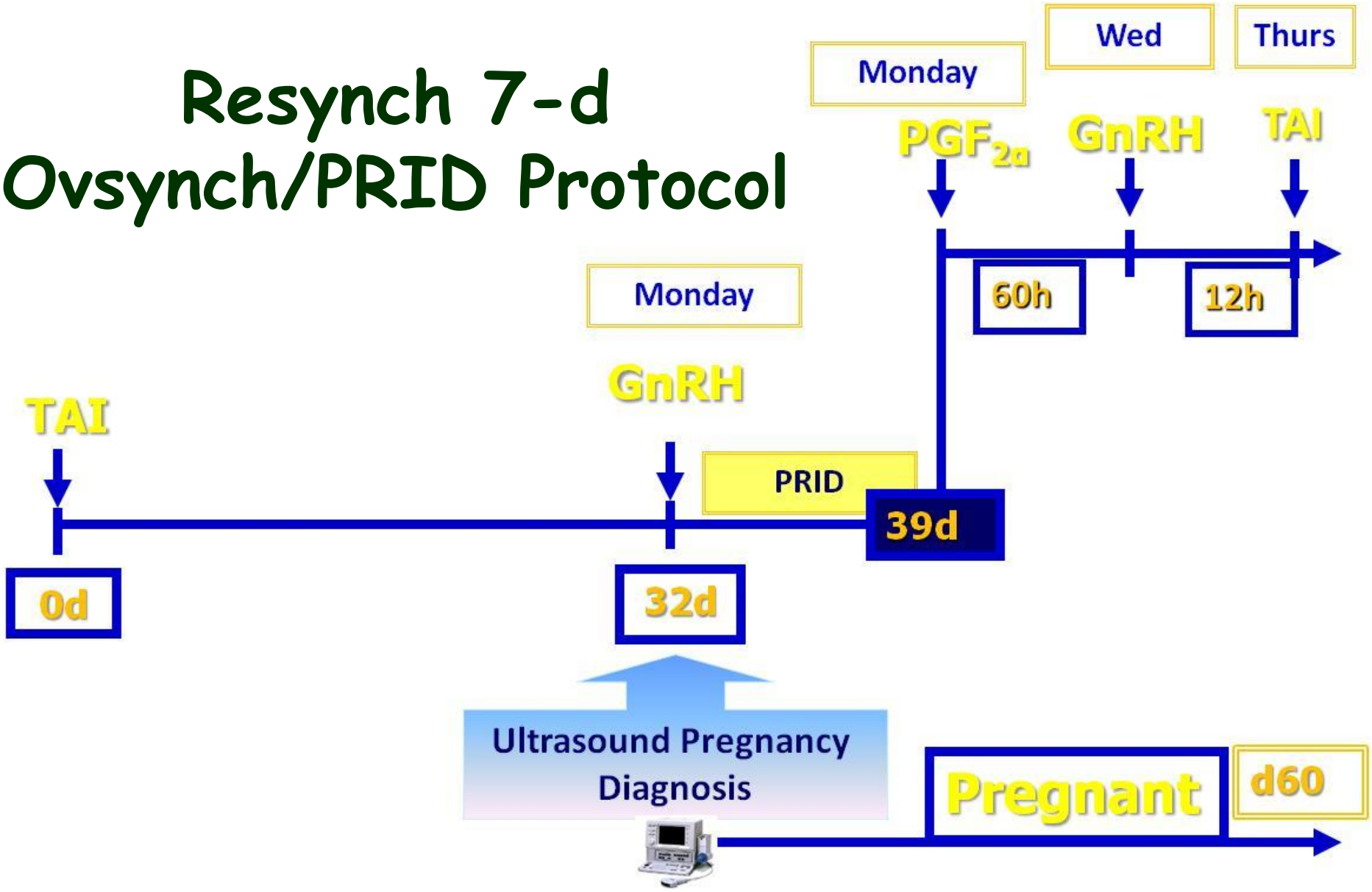
RESYNCHRONIZATION



THREE AI BEFORE 150 DIM

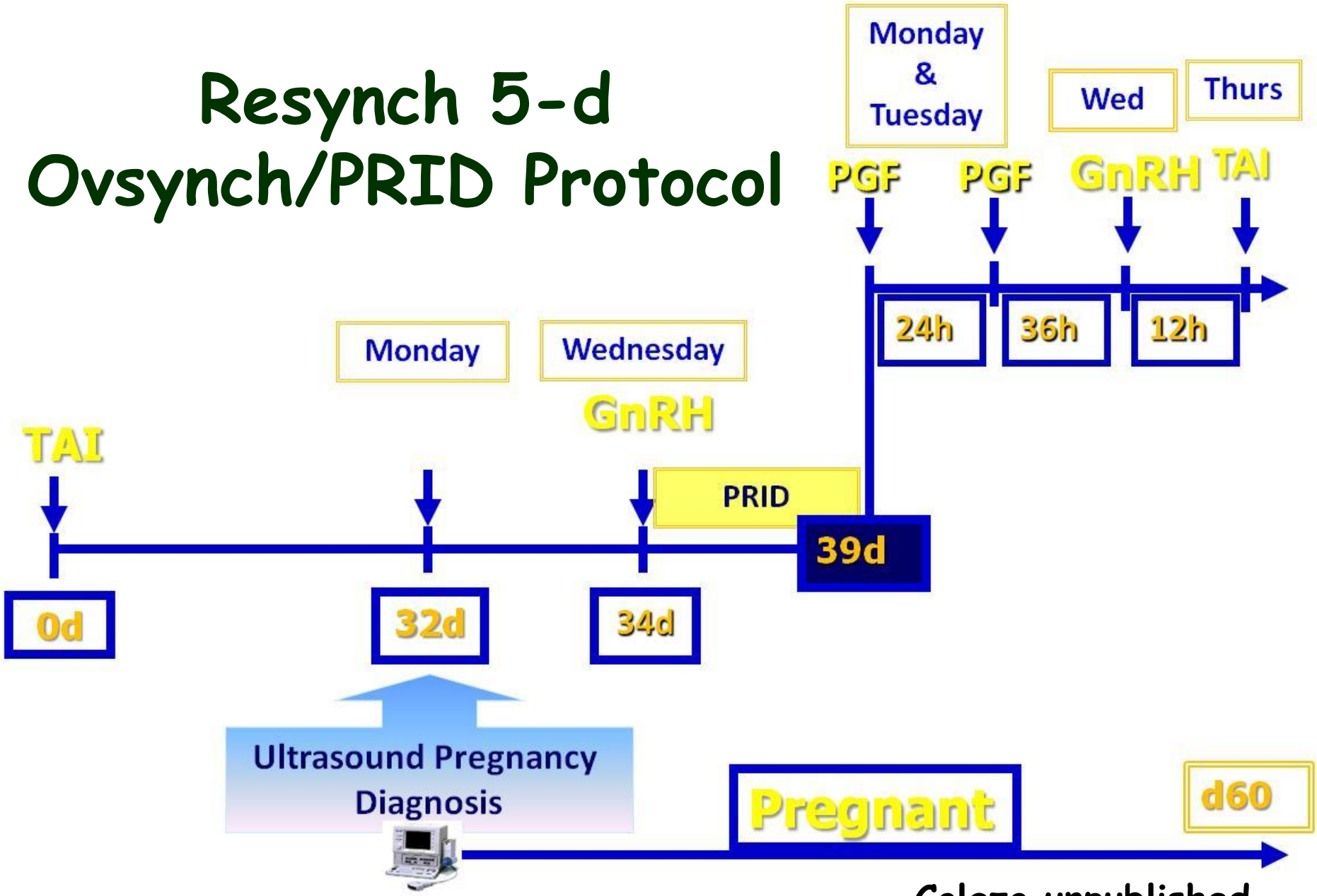


Resynch 7-d Ovsynch/PRID Protocol



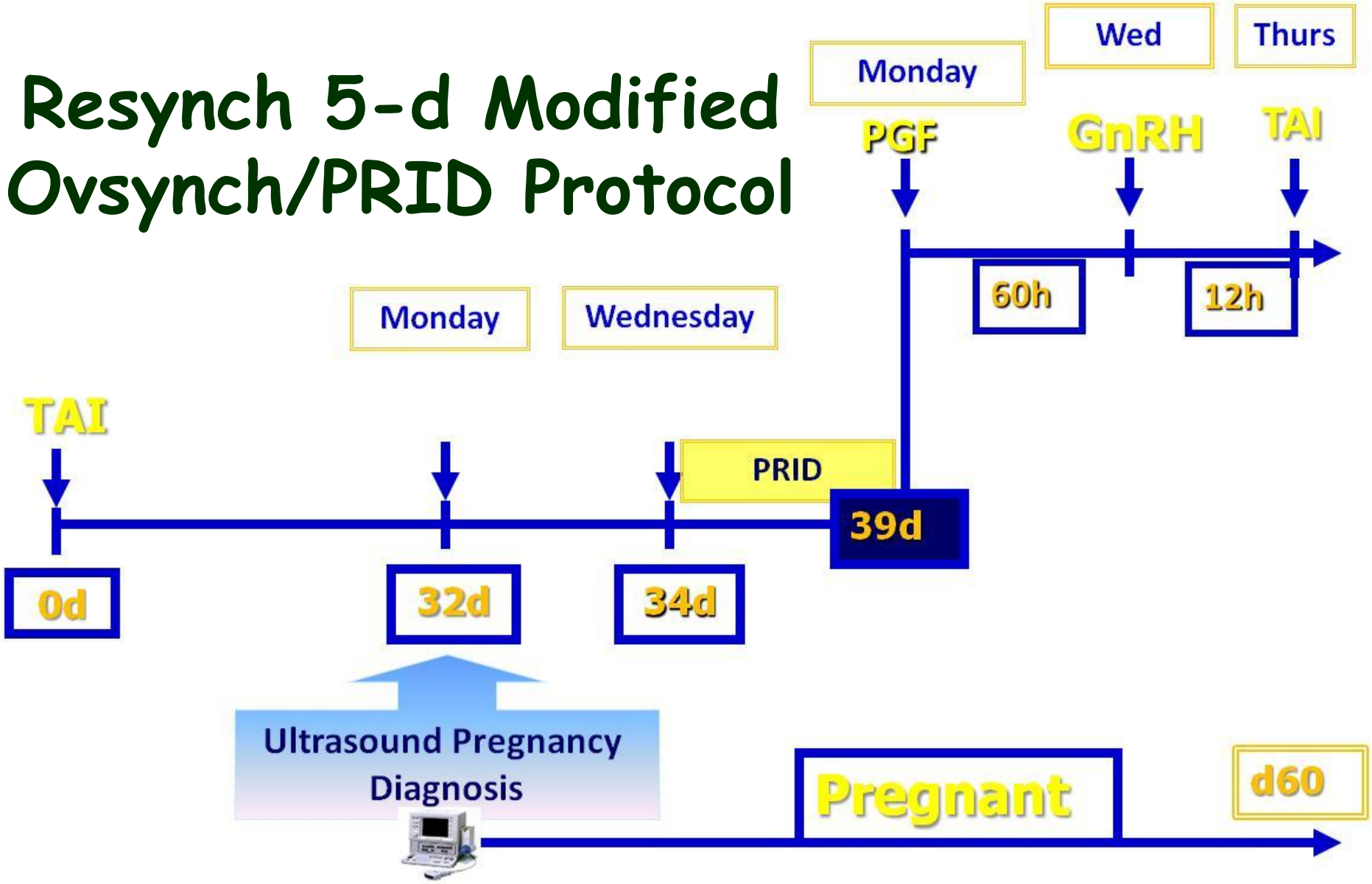
Colazo unpublished

Resynch 5-d Ovsynch/PRID Protocol



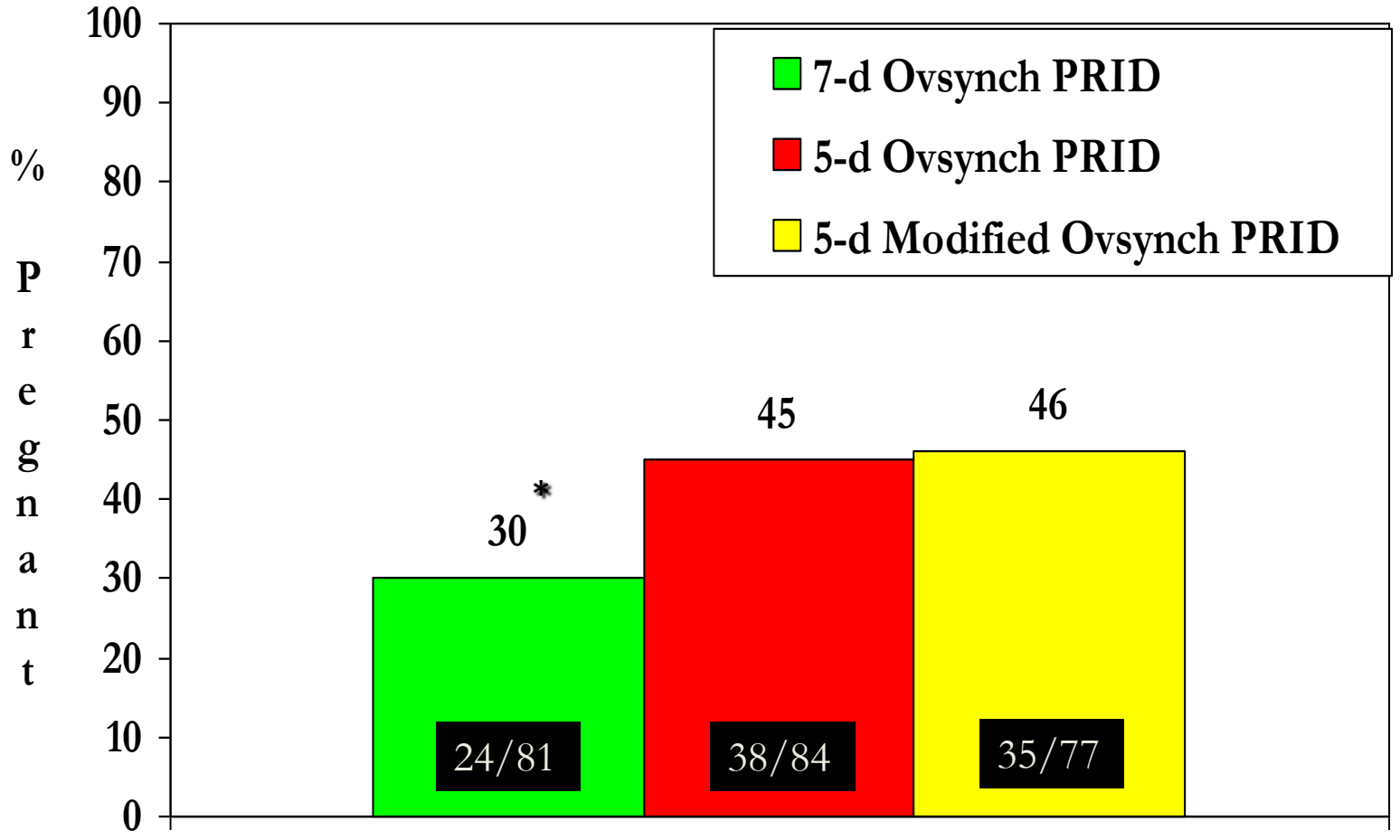
Colazo unpublished

Resynch 5-d Modified Ovsynch/PRID Protocol



Colazo unpublished

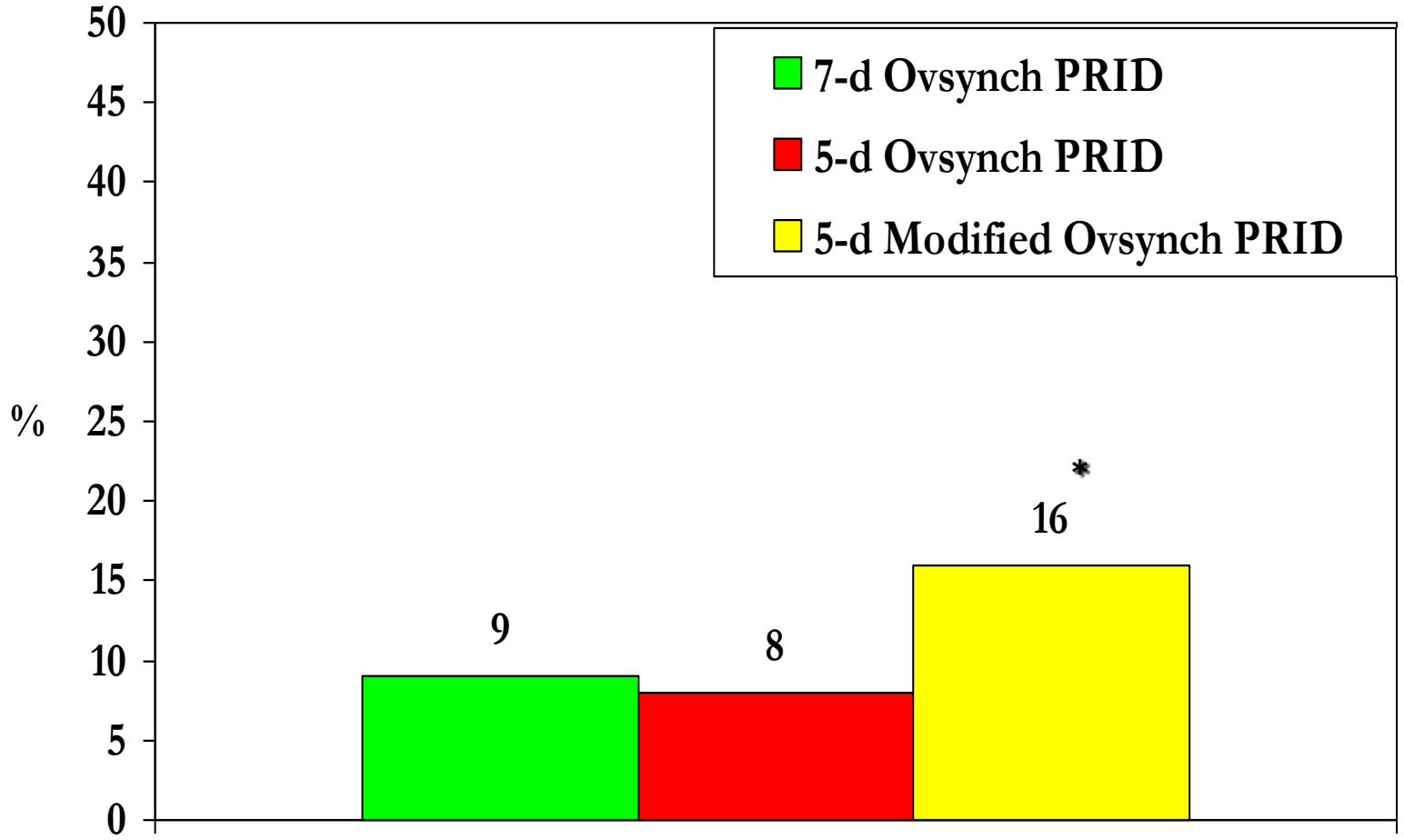
Resynch Pregnancy Rate 32 d



Trt, P <0.05

Colazo unpublished

Pregnancy loss between 32 and 60 d



Trt, P <0.1

Colazo unpublished

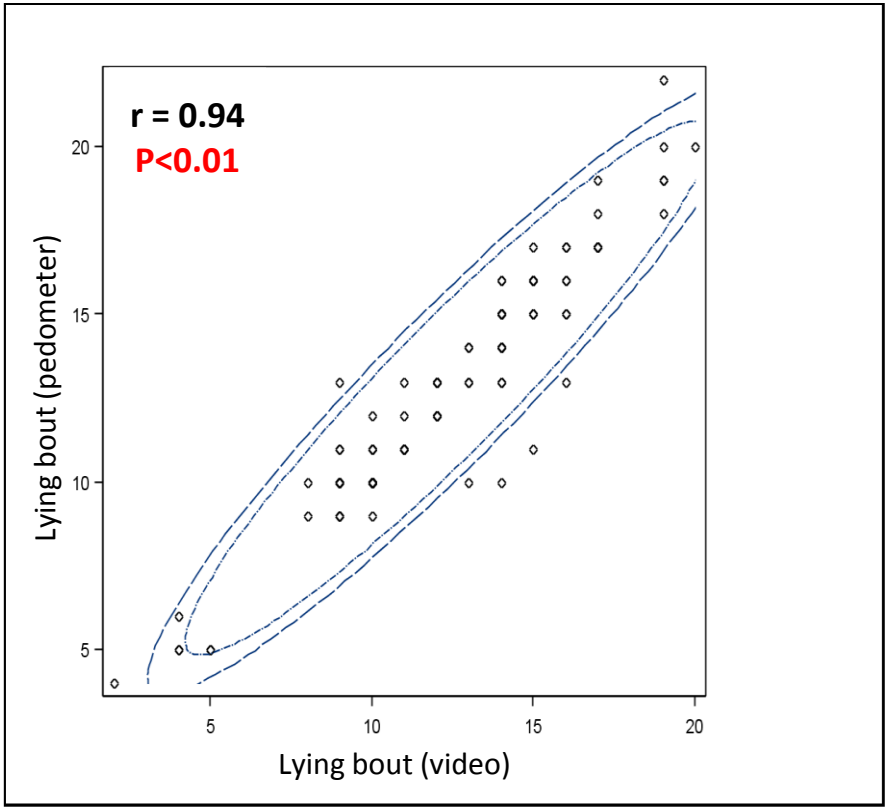
Question 3

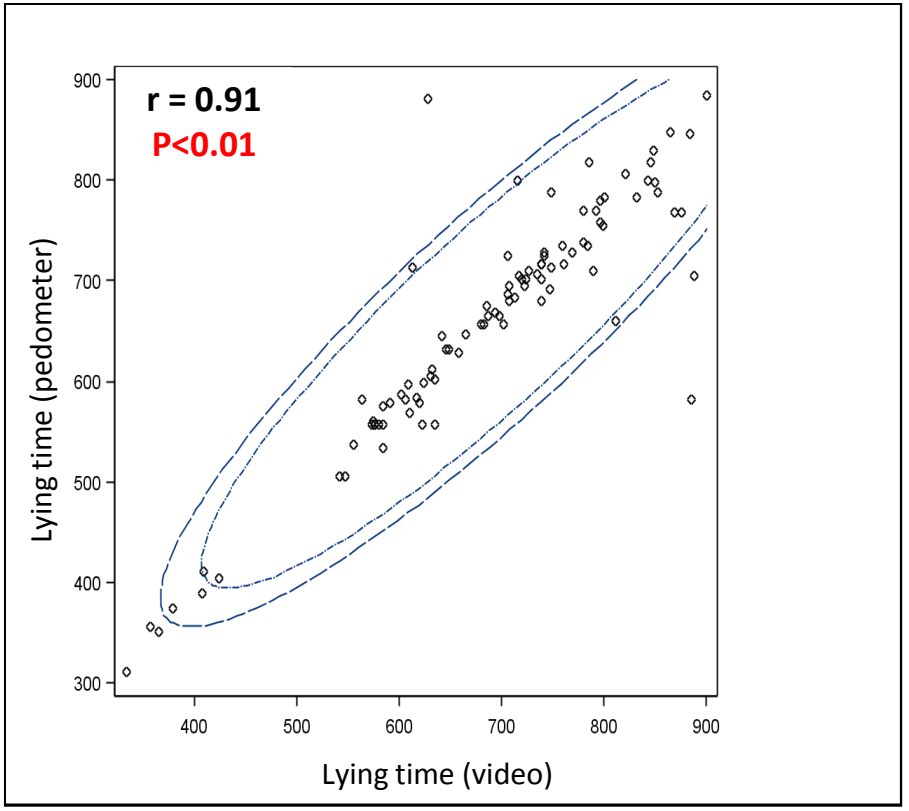
What is your opinion on automated estrus detection technologies?

- Very positive?
- Positive?
- Unsure/undecided?
- Negative?

Innovation of the past decade: Improved systems for ED

Correlations between pedometer and video

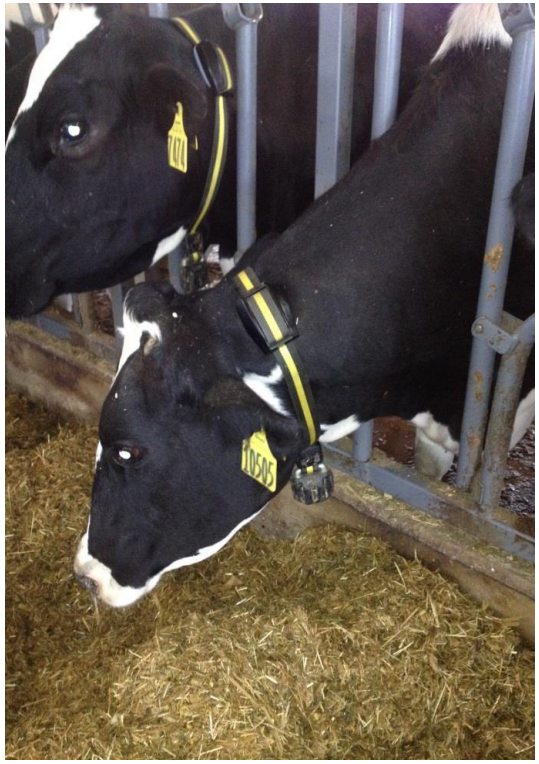




Felton et al., 2009

AAM Systems for Estrus Detection

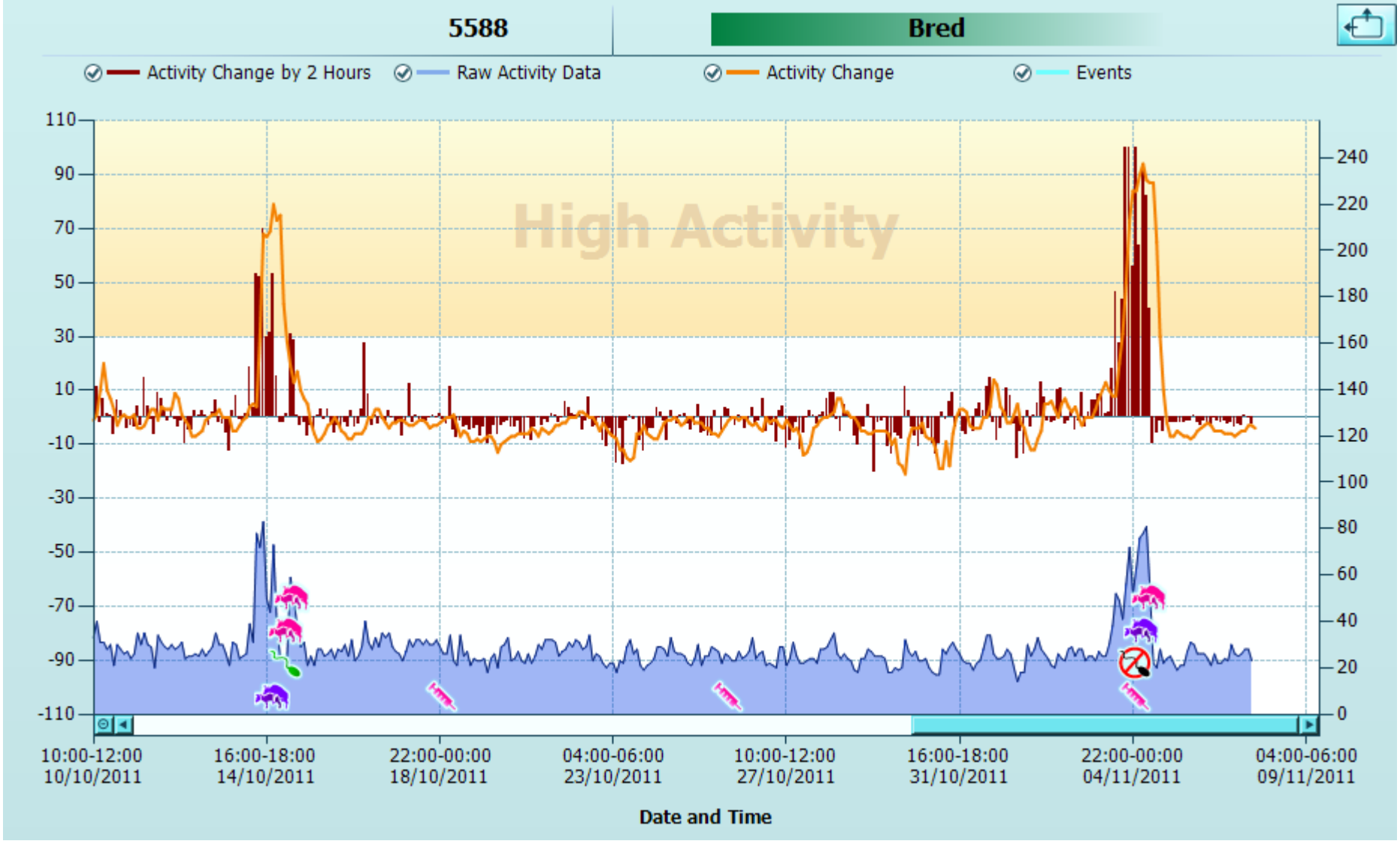
Activity Tag



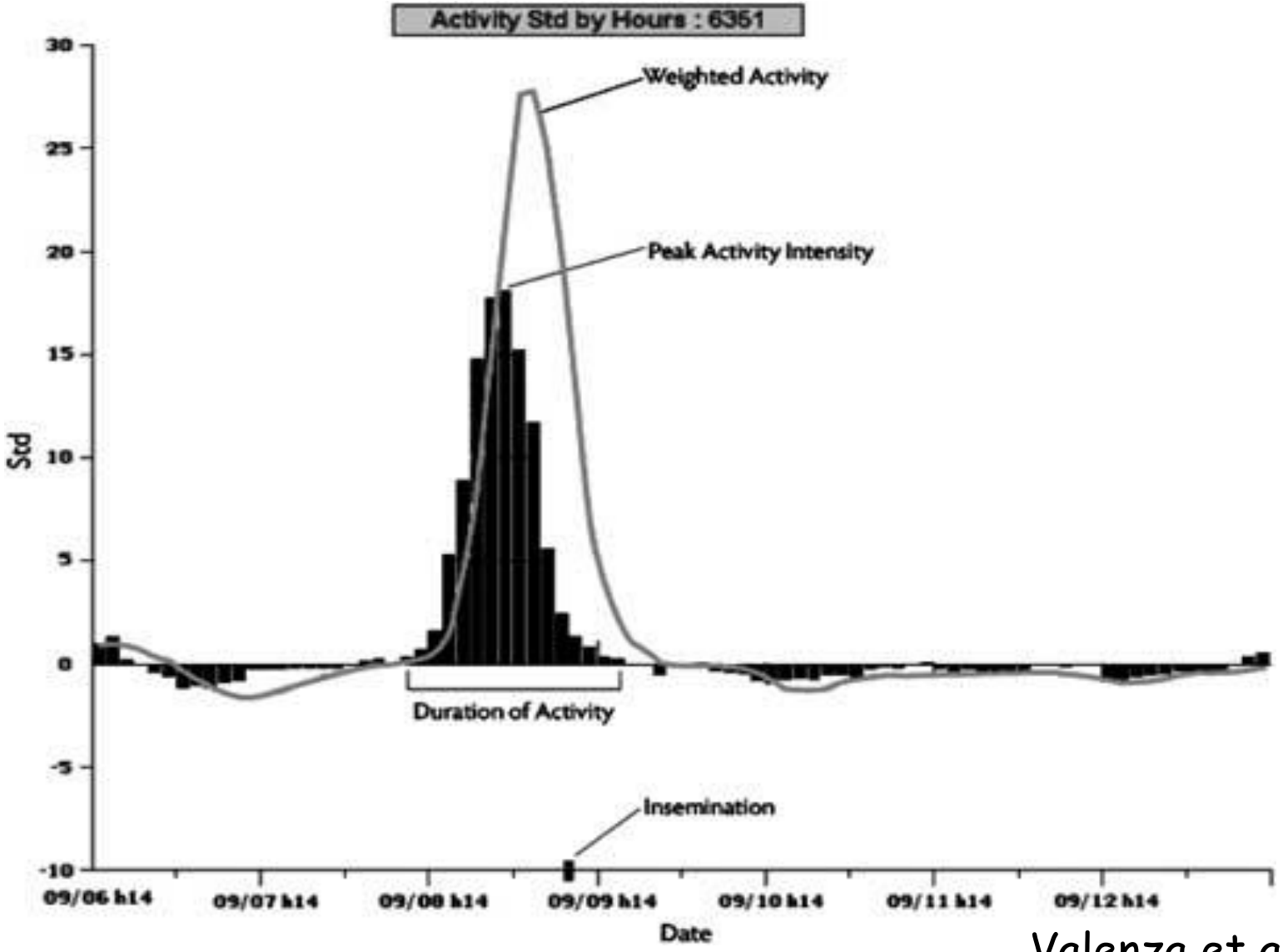
Reader

Software

AAM Systems for Estrus Detection



Graph of activity report data



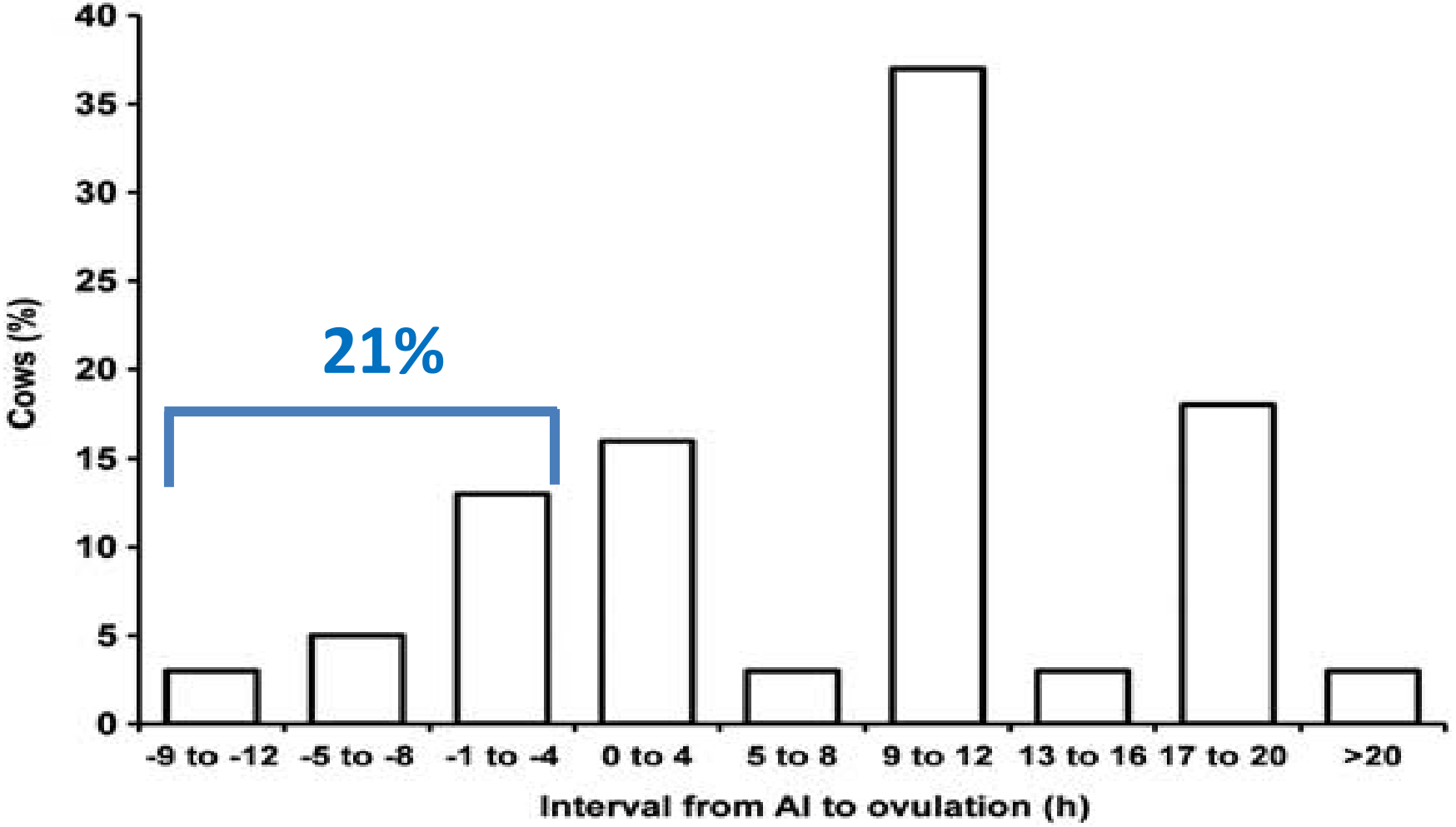
Valenza et al., 2013

Percentage of cows in estrus and ovulating based on use of an AMS or heatmount detectors

Items	Activity monitoring system [% (n/n)]	Heatmount detectors [(% (n/n)]
Estrus	71 (63/89)	66 (59/89)
Ovulation	95 (60/63)	93 (55/59)
No Ovulation	5 (3/63)	7 (4/59)
No Estrus	29 (26/89)	34 (30/89)
Ovulation	35 (9/26)	47 (14/30)
No Ovulation	65 (17/26)	53 (16/30)

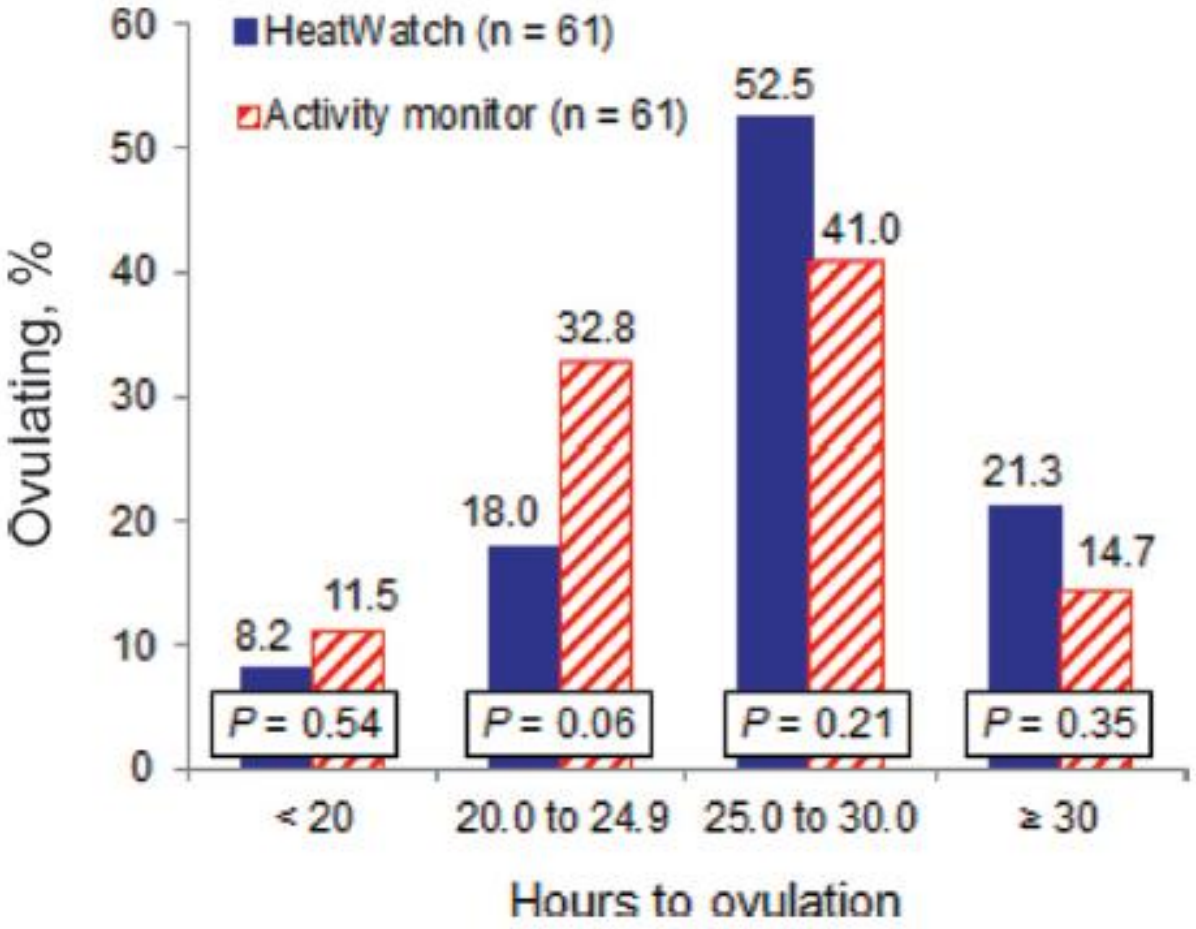
Valenza et al., 2013

Distribution of cows based on the interval from AI to ovulation



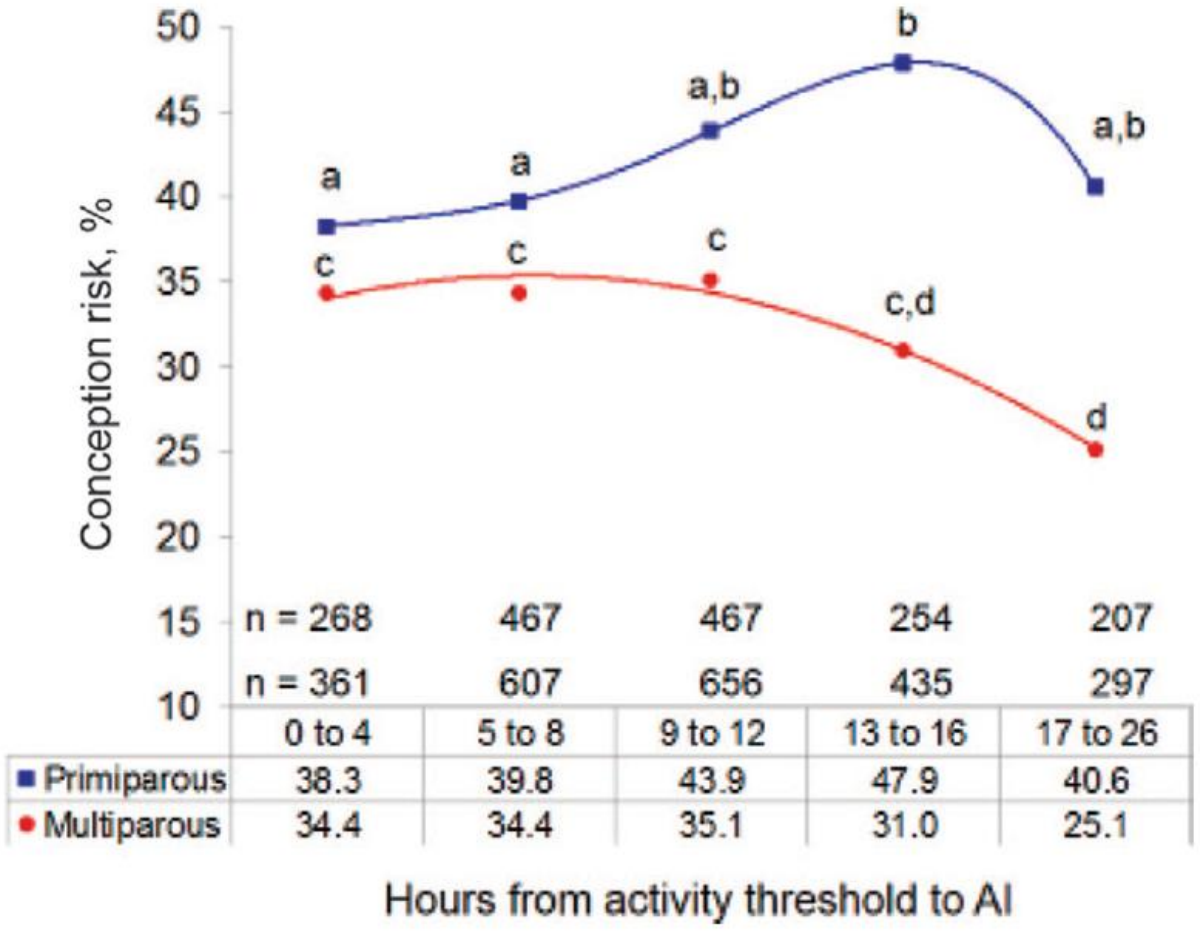
Valenza et al., 2013

Time of ovulation



Stevenson et al (2014)

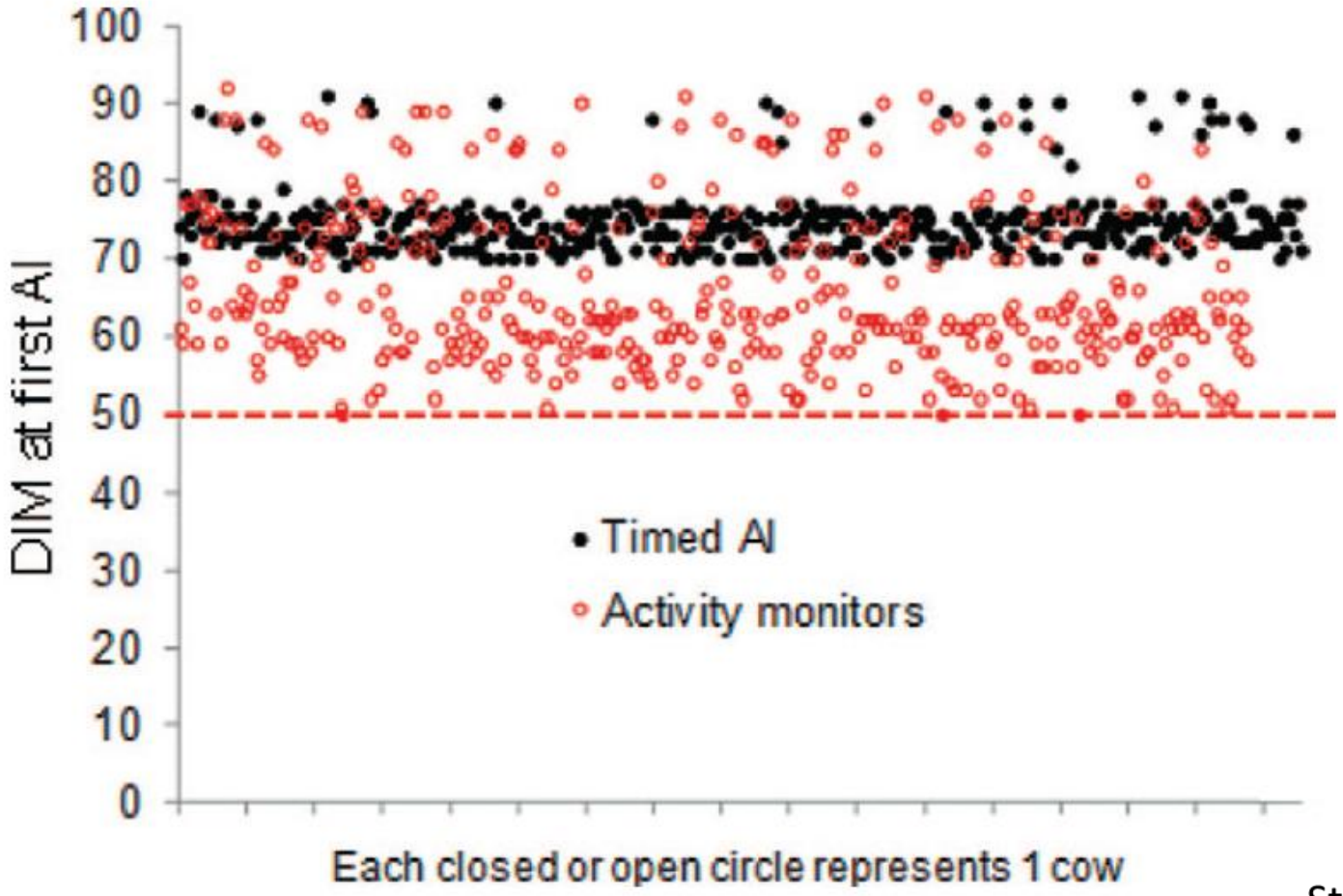
Time of AI relative to activity threshold



	0 to 4	5 to 8	9 to 12	13 to 16	17 to 26
n = 268	467	467	254	207	
n = 361	607	656	435	297	
■ Primiparous	38.3	39.8	43.9	47.9	40.6
● Multiparous	34.4	34.4	35.1	31.0	25.1

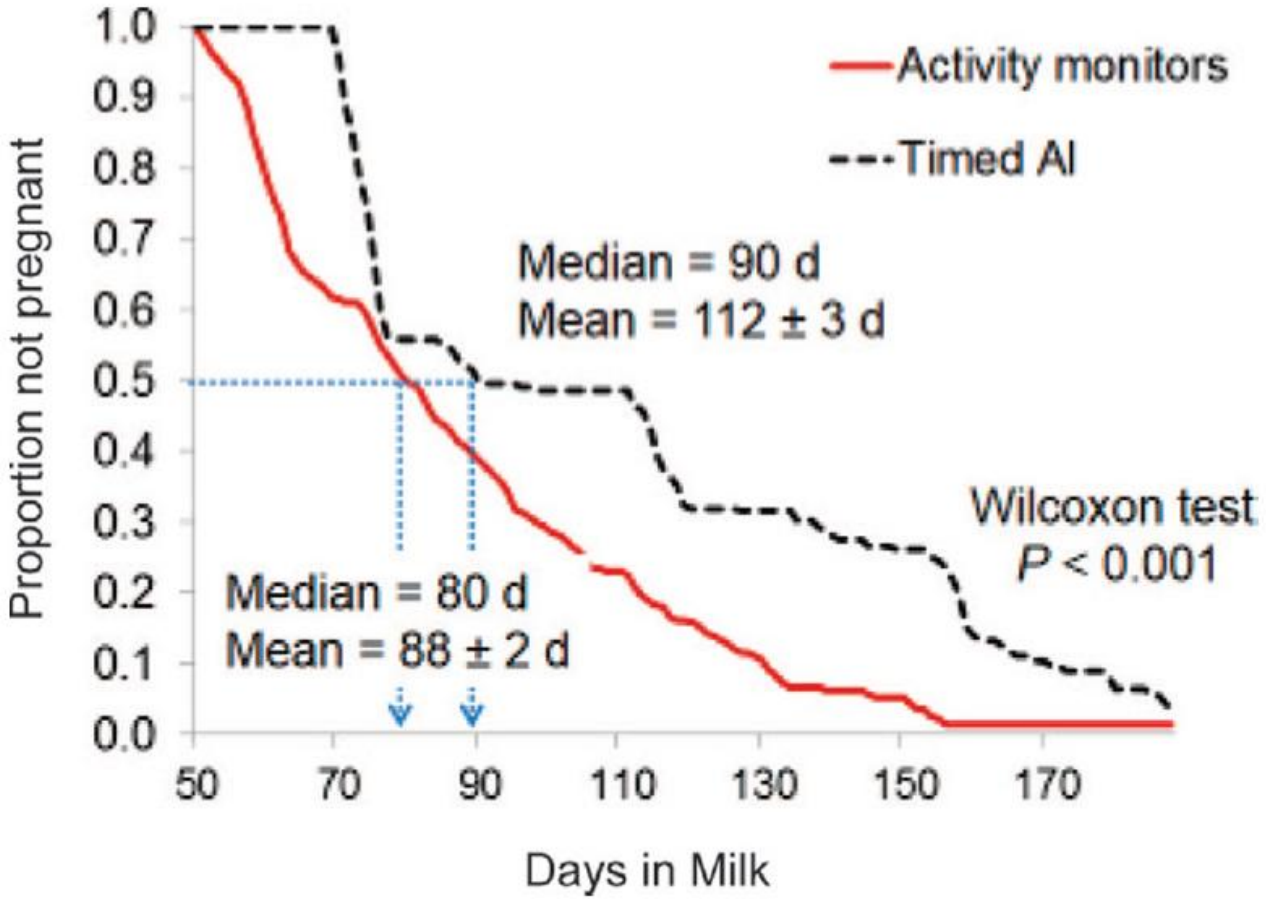
Stevenson et al (2014)

Timed AI vs MooMonitor



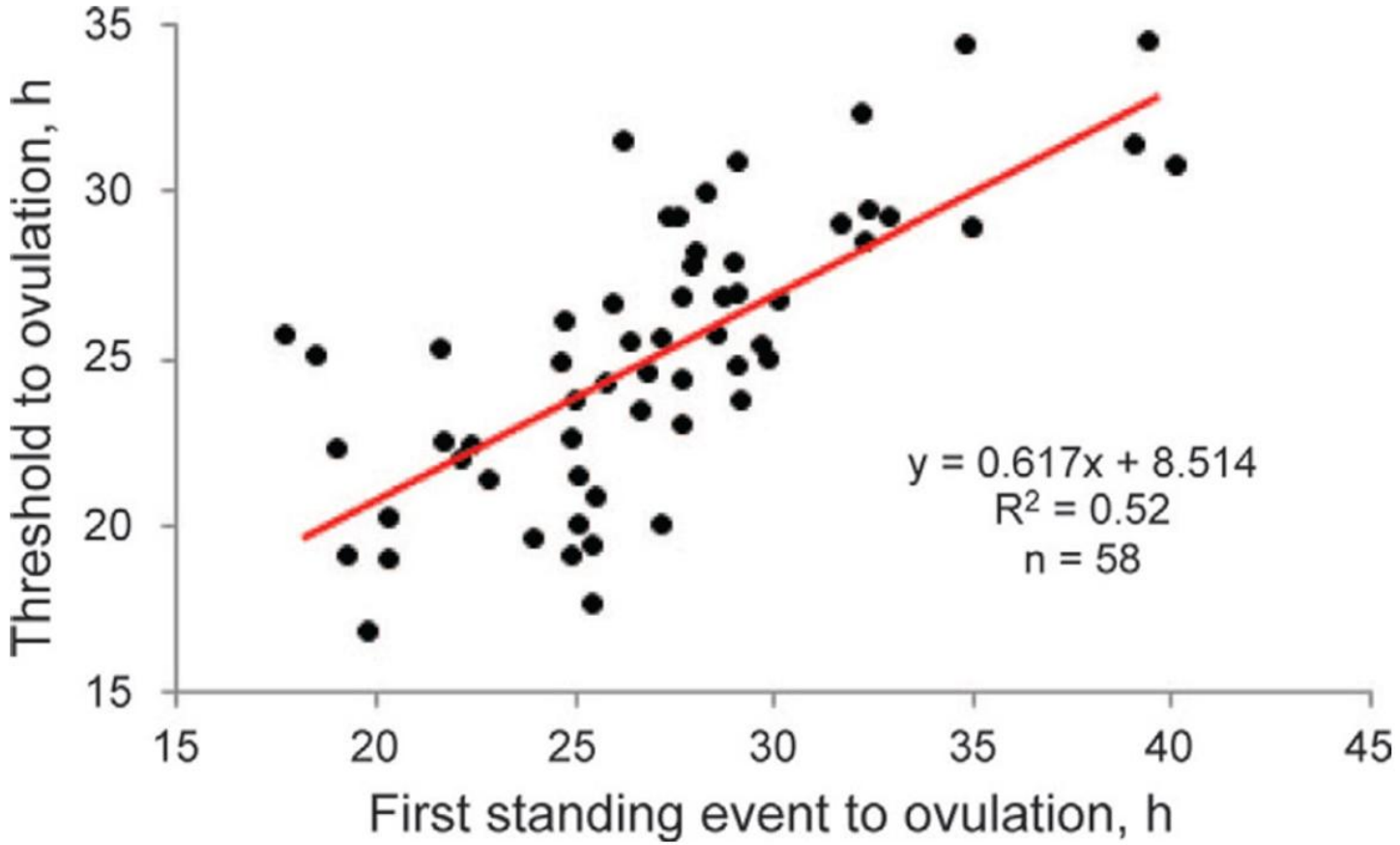
Stevenson et al (2014)

Timed AI vs MooMonitor

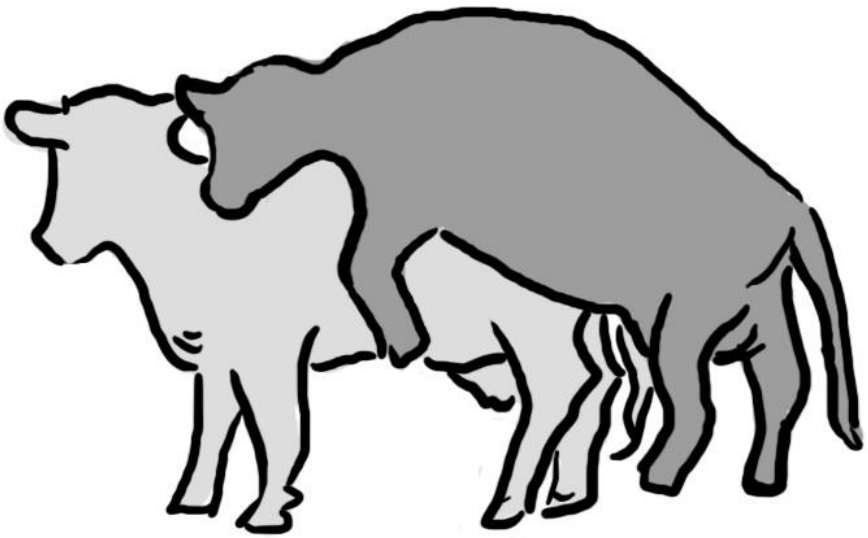


Stevenson et al (2014)

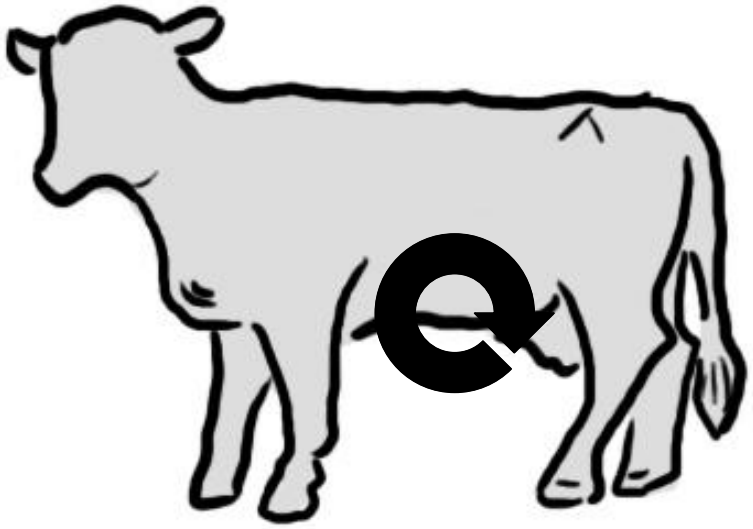
Activity threshold and first standing event



Is there another way?

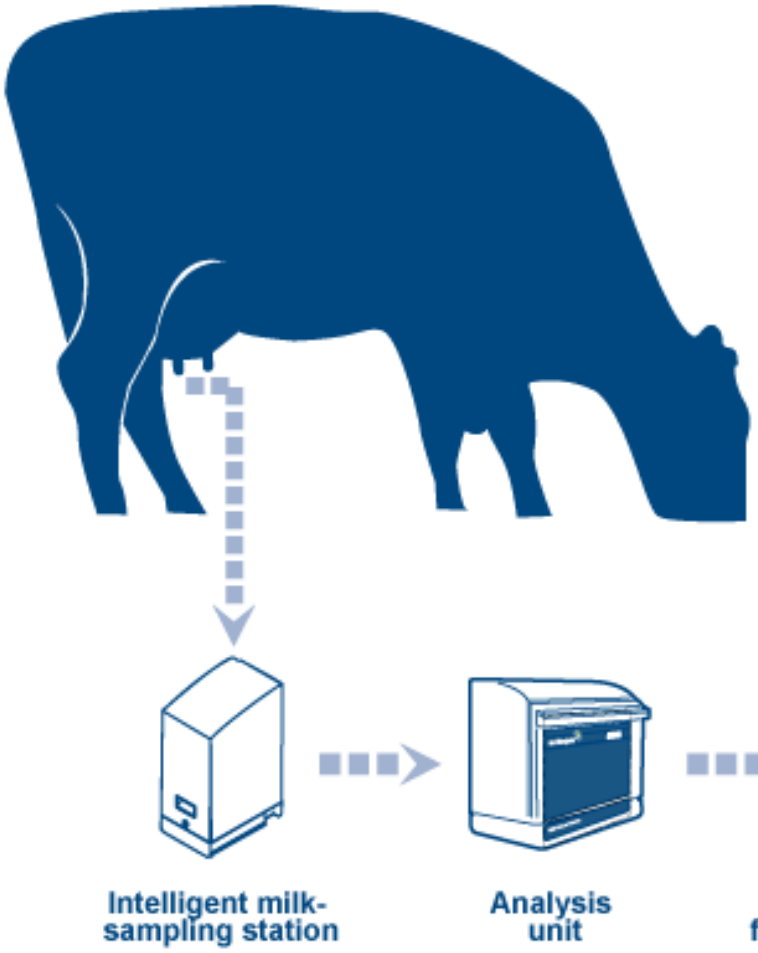


Detection of estrous behavior



Detection of approaching ovulation in the absence of estrous behavior (biochemical test)

In-line Progesterone: Herd Navigator



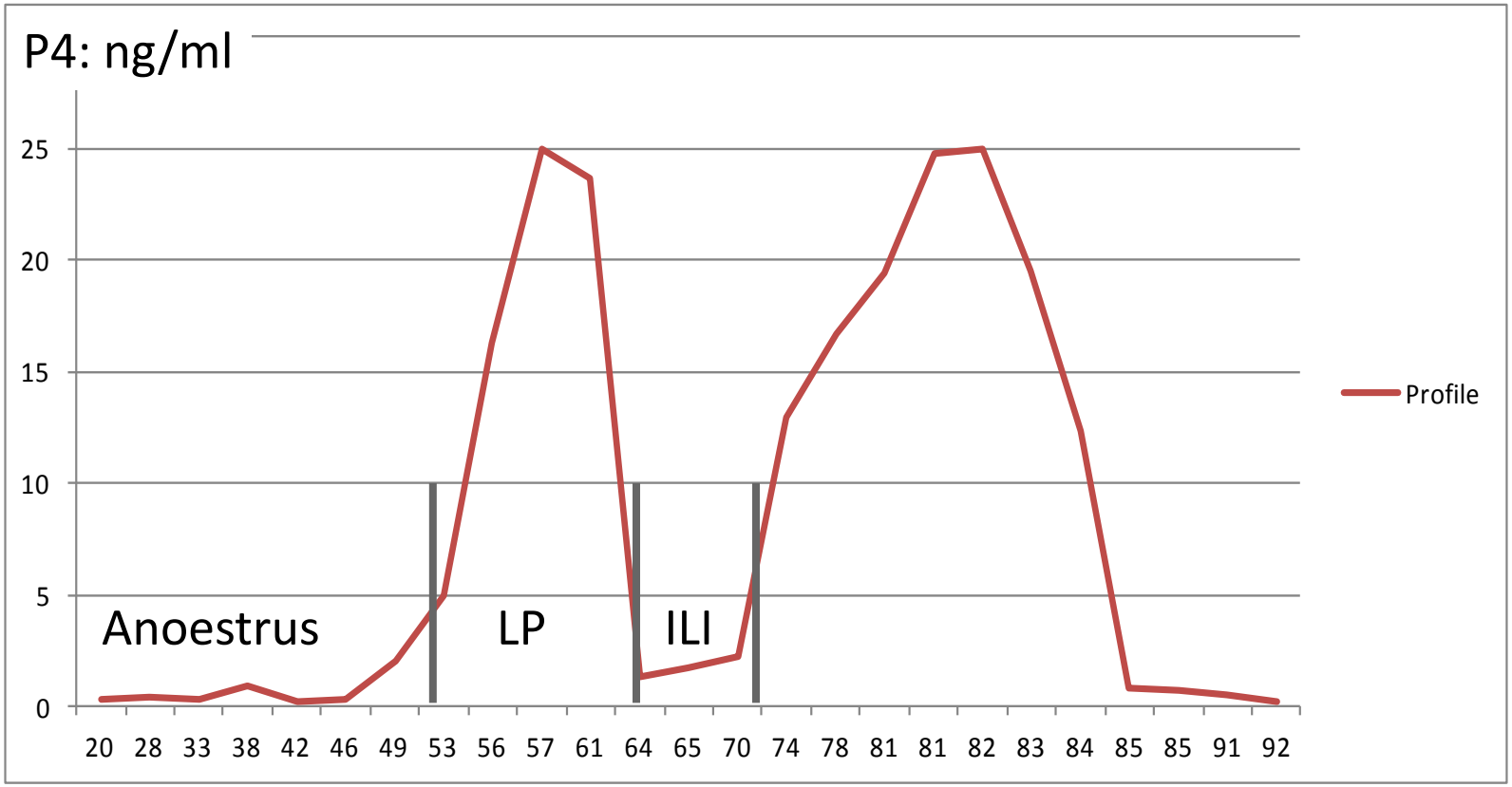
Detects heat by measuring progesterone
Early detection of: silent heat, heat, pregnancy, abortion, folicular and luteal cysts, and prolonged anoestrus.

Detects mastitis by measuring LDH, lactate dehydrogenase
Early detection of subclinical and acute mastitis.

Detects ketosis by measuring BHB, beta-hydroxybutyrate
Early detection of: subclinical ketosis, ketosis, metabolic diseases. Herd Navigator™

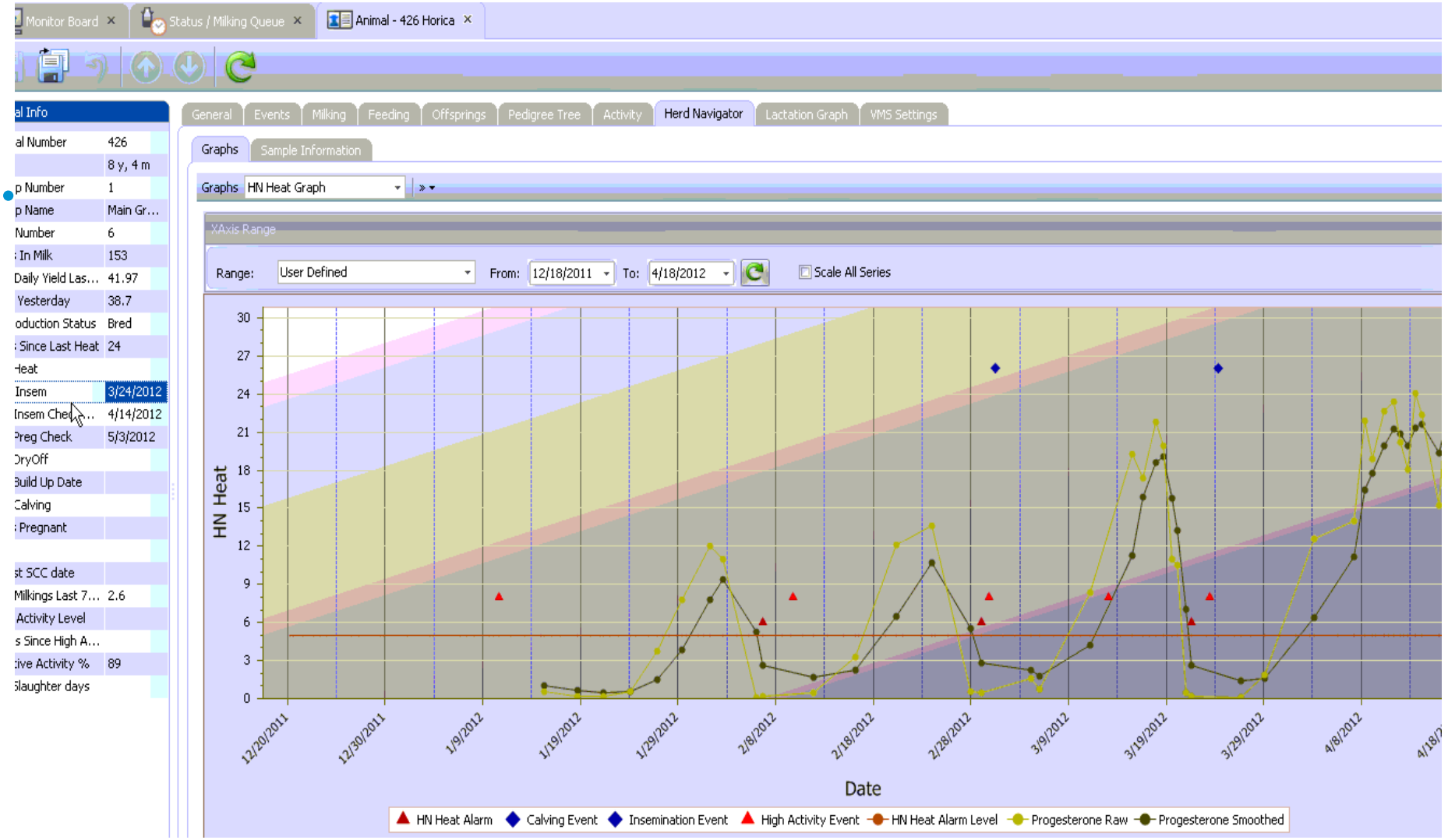
DeLaval

Progesterone profile

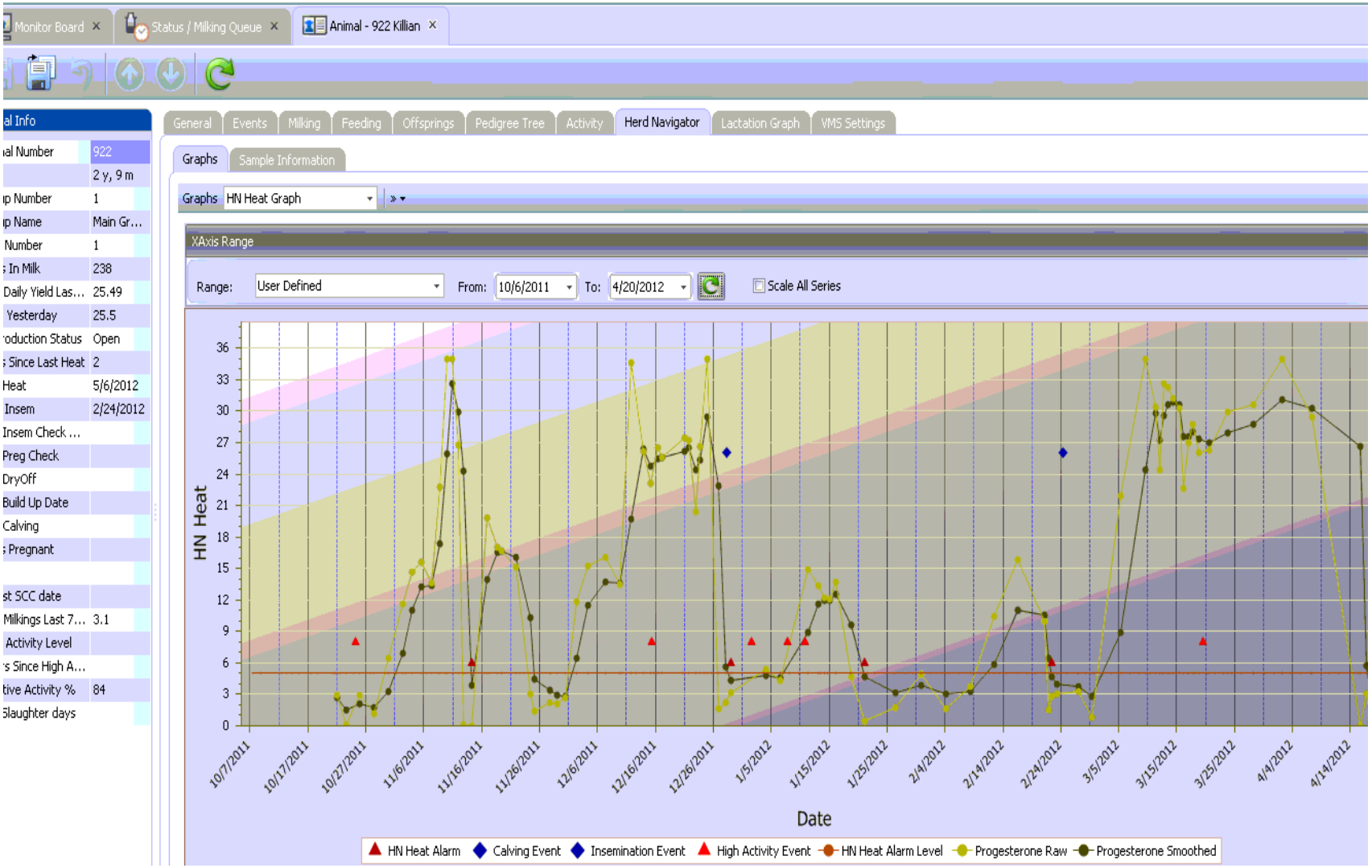


LP = Luteal Phase; ILI = Inter-Luteal Interval

Cow 426 – Reproductive Graph

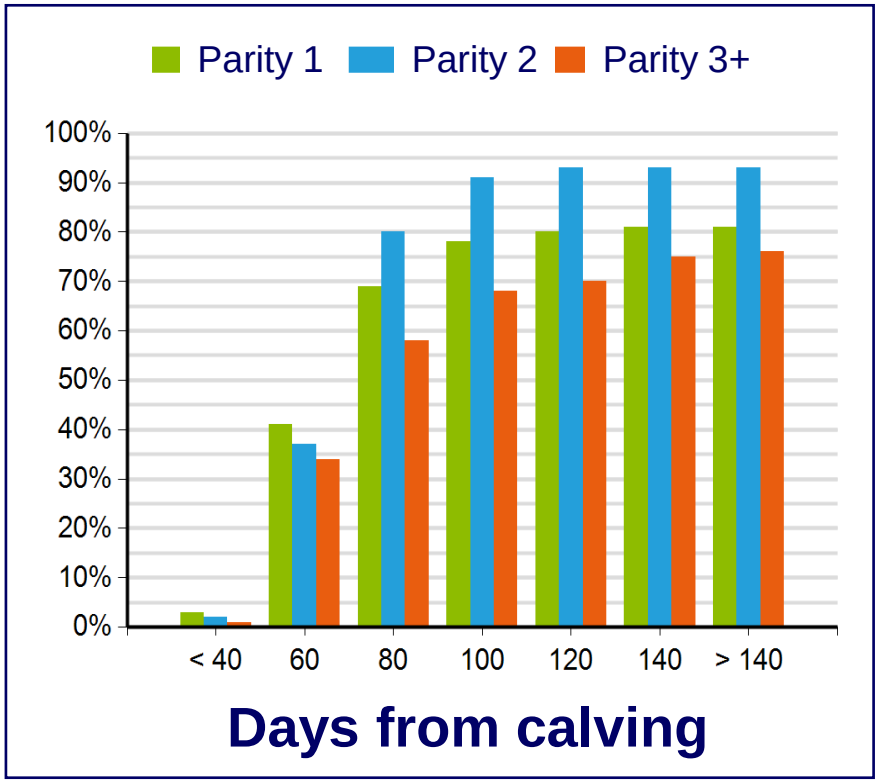


Cow 922 – Progesterone Graph

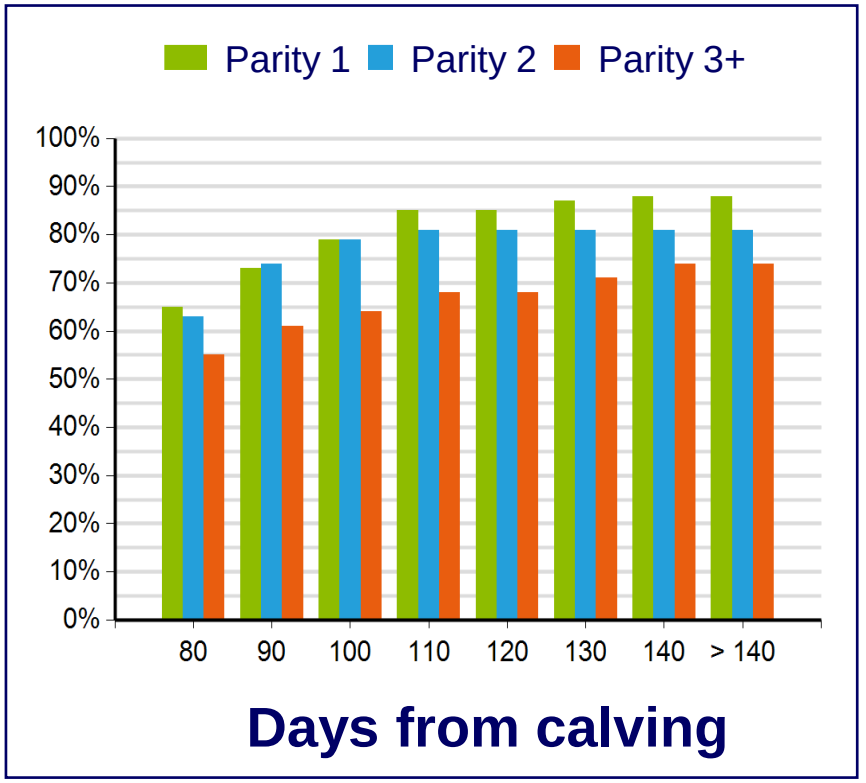


Reproduction results, Farm 1

% of fresh cows inseminated



% of inseminated cows pregnant



Reproduction results, Farm 1

	HN	Visual Observation	
Number of Cows: 187	**2014**	**2013**	**2012**
Submission Rate, %	73	50	41
Conception Rate, %	46	47	43
Pregnancy Rate, %	0.33	0.23	0.18

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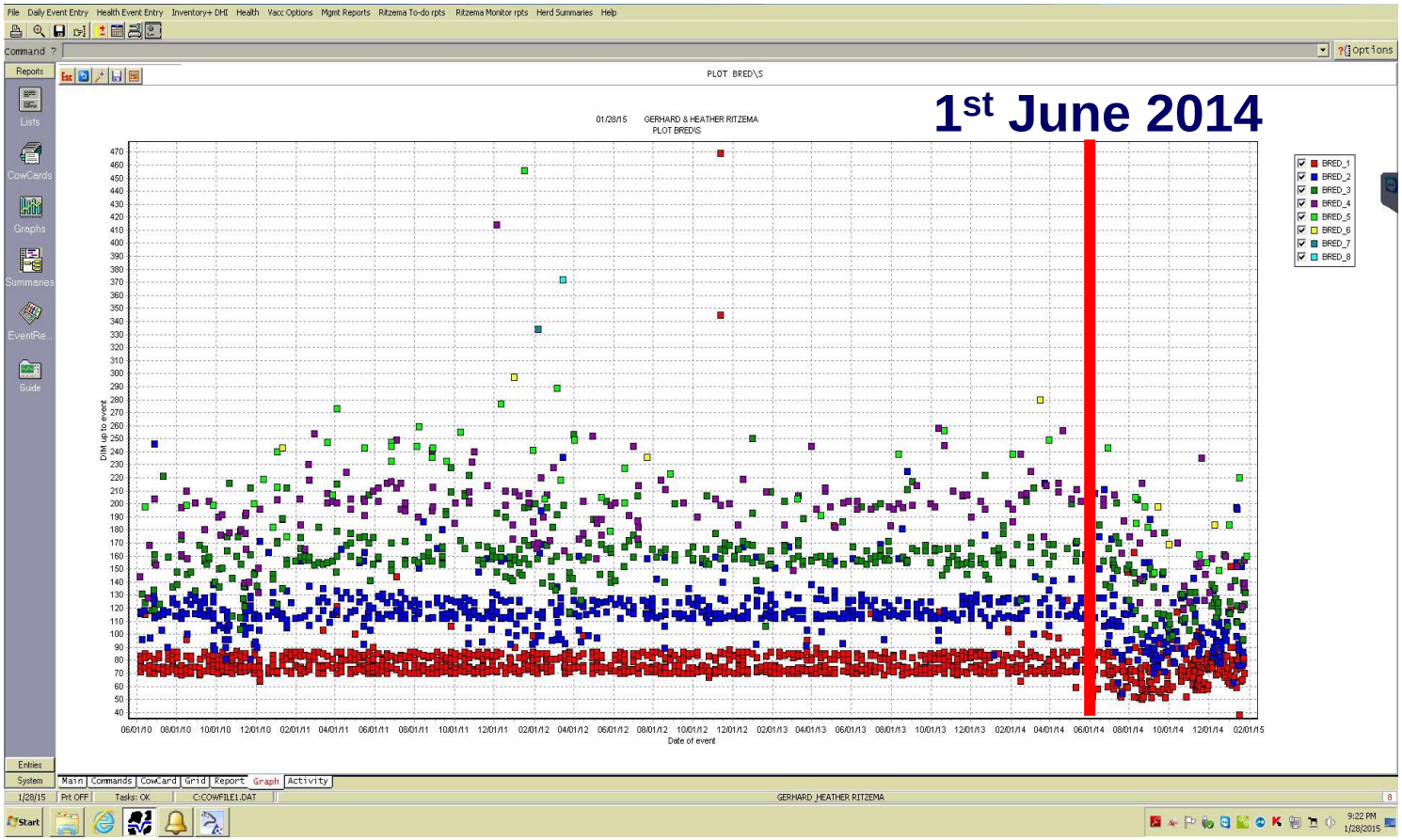
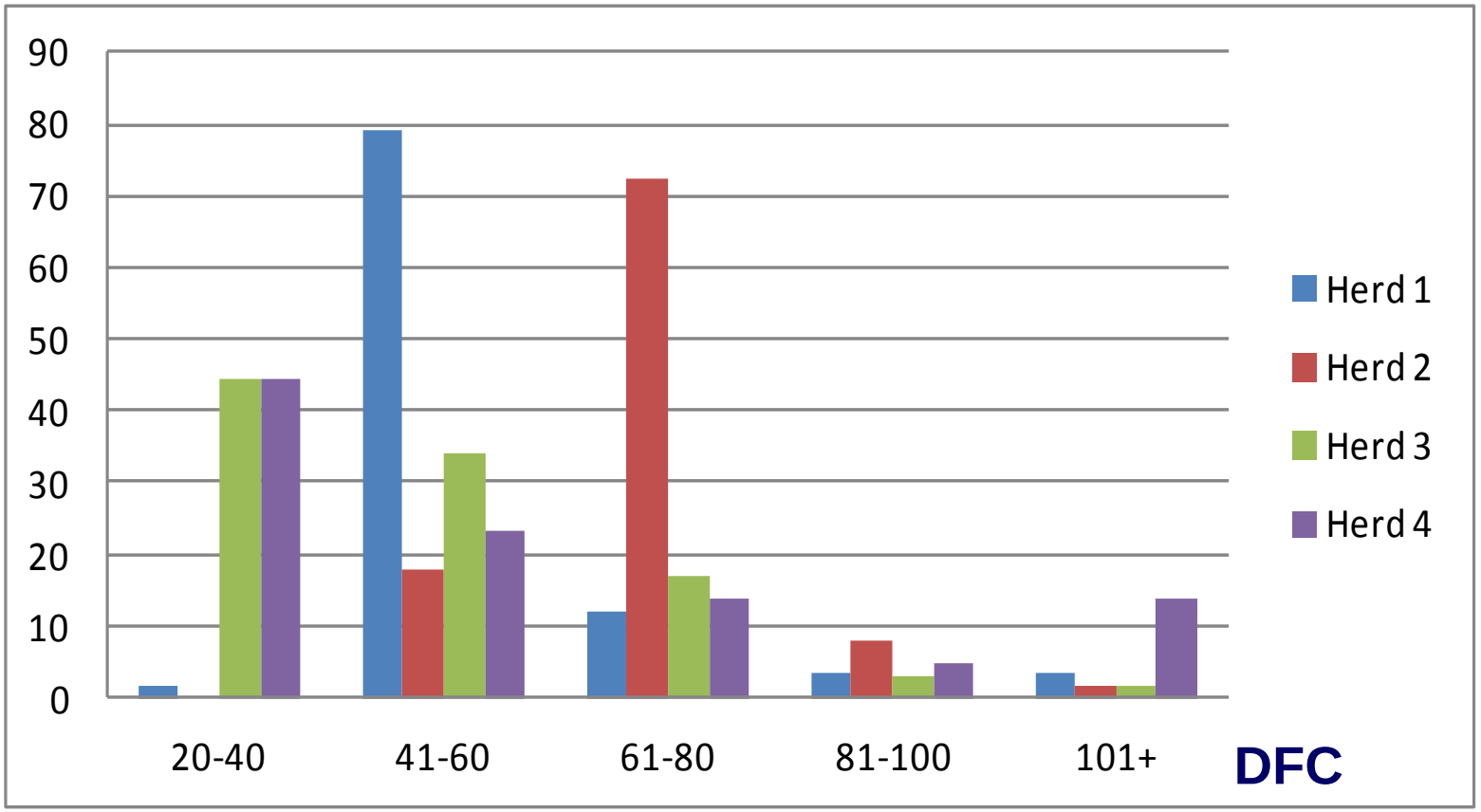
Shift from sync program to HN, Farm 2



Commencement of first luteal activity



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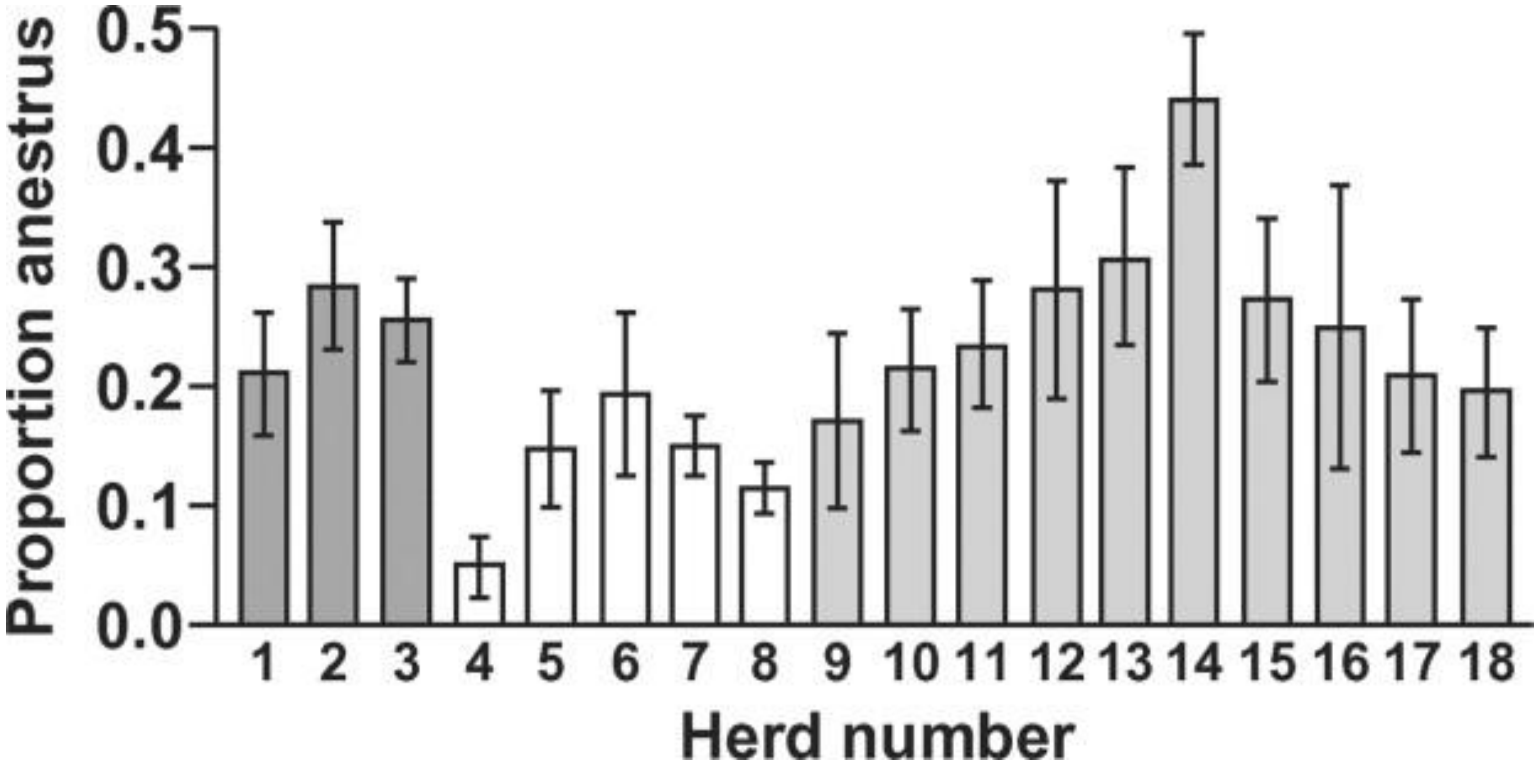
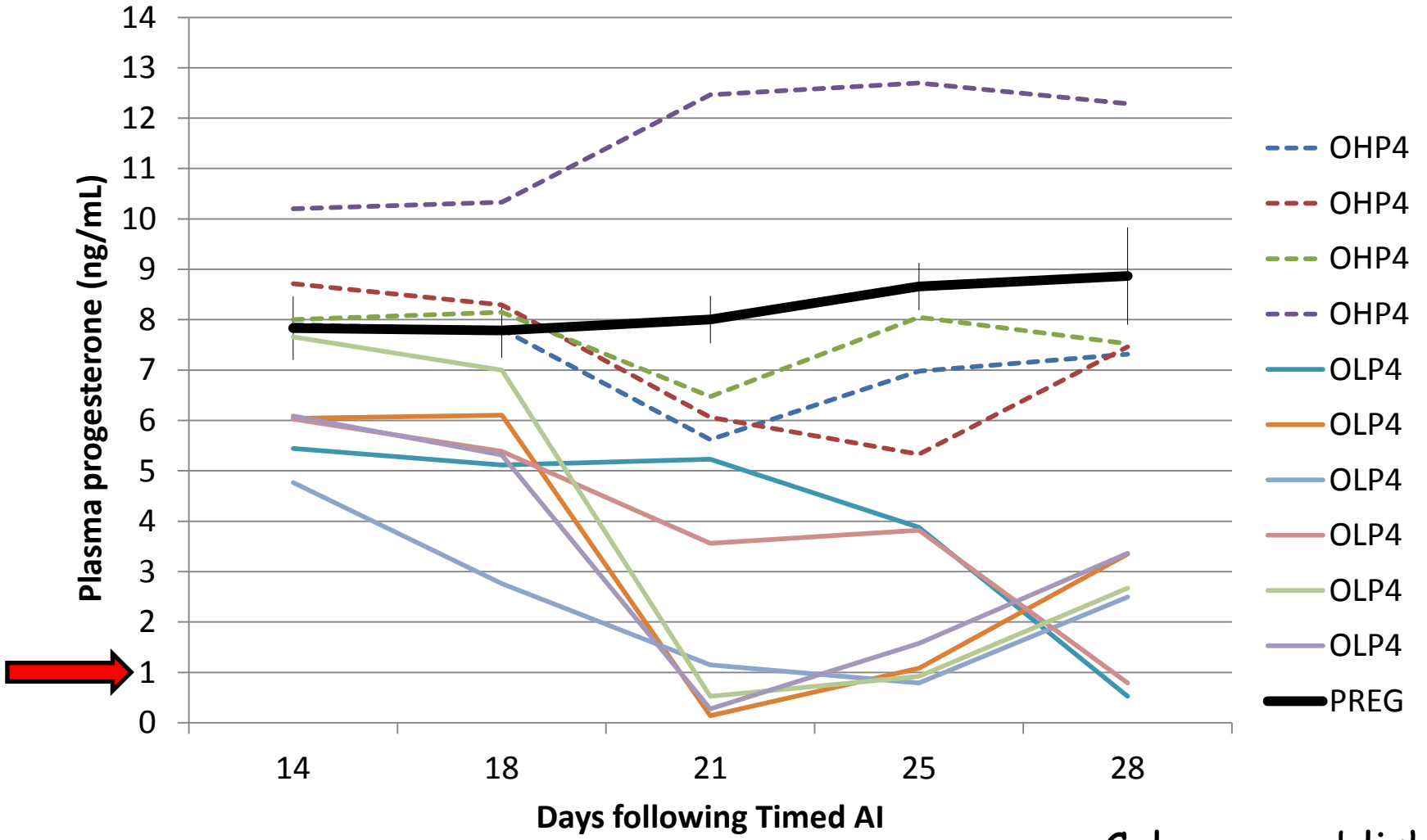
Prevalence of anovulation in 18 Ontario dairy herds



Walsh et al., 2007

Plasma progesterone profiles of dairy cows after timed-AI



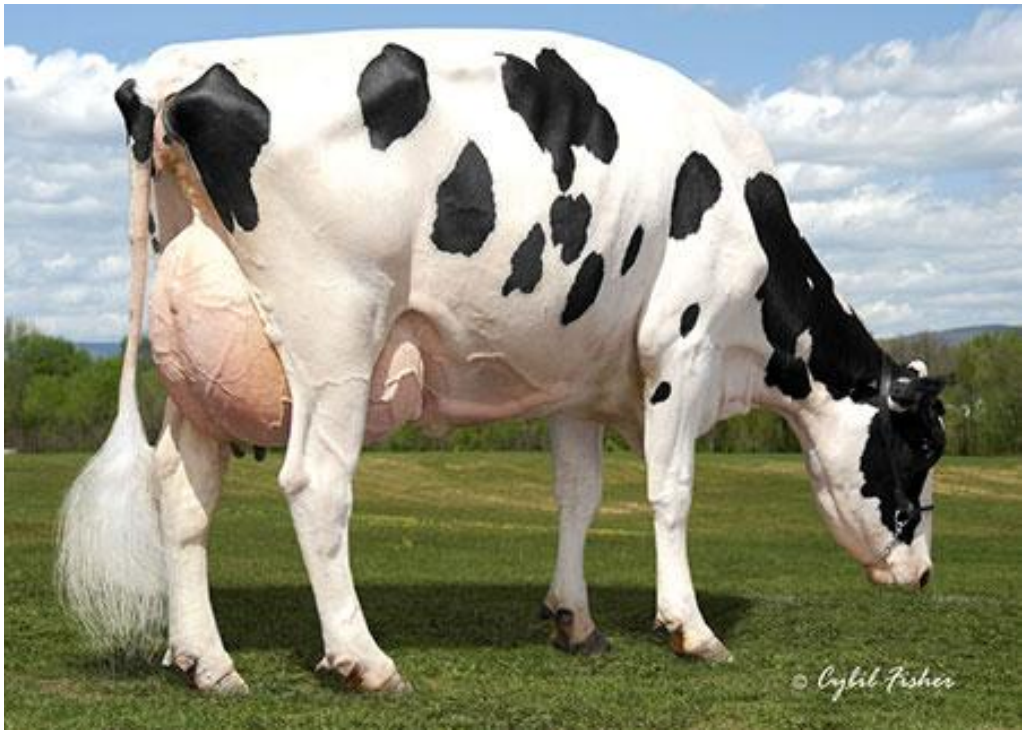
Colazo unpublished

Question 4

Genetics has a major effect on herd fertility. I place major emphasis on fertility traits when choosing bulls.

- Very positive?
- Positive?
- Unsure/undecided?
- Negative?

The North American Holstein……..



BETTY FORD CLINIC

PATIENT IN TRAINING

What do WE expect?

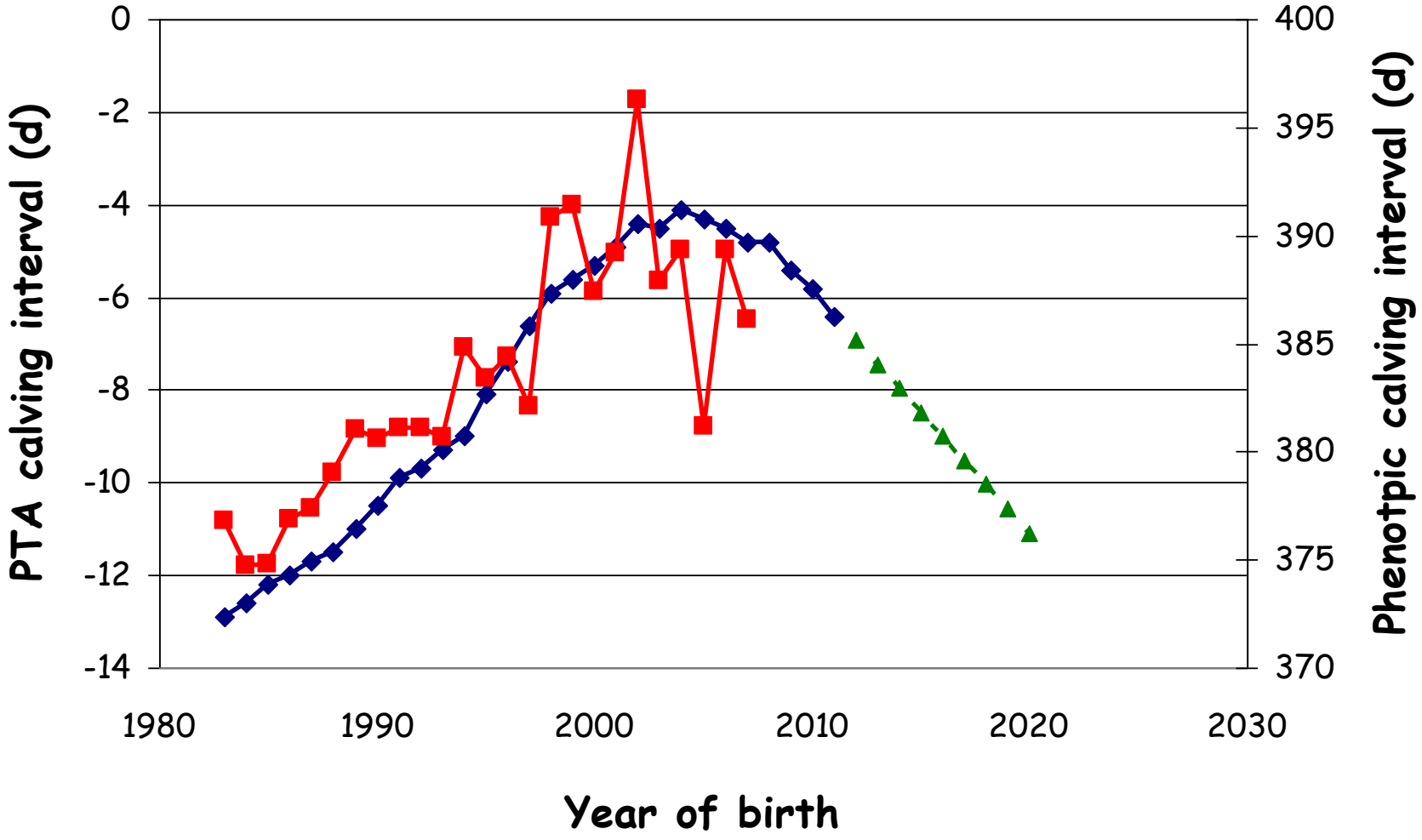
Strong signs of heat!!

Oestrous Behaviour
Fert+ vs Fert- cows

	Fert+	Fert-	*P*-value
Duration of Heat (hr)	7.53	5.86	0.08
Peak activity	168	119	0.01
Silent heats	2%	22%	0.02
Heat without ovulation	0%	14%	0.04

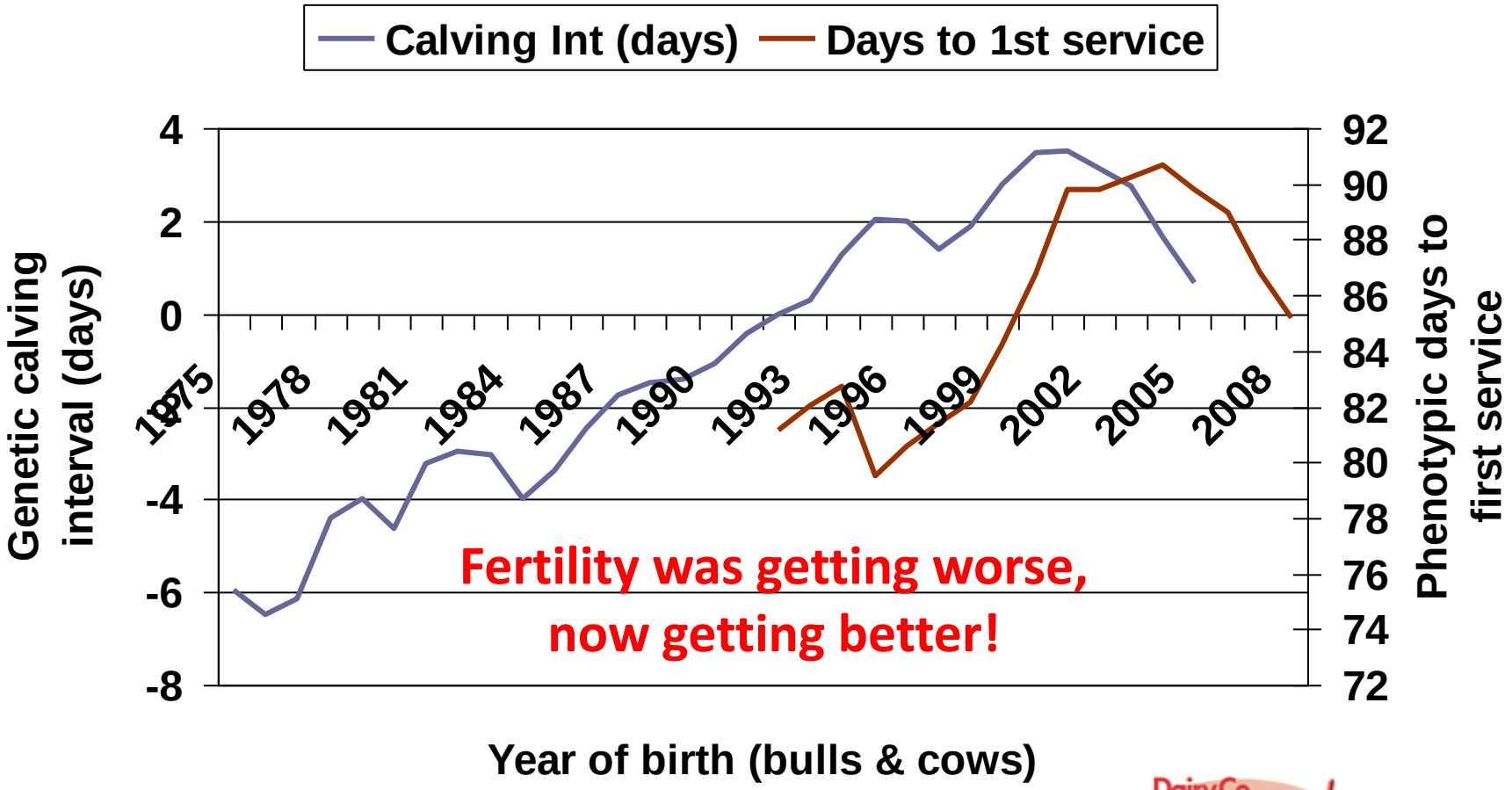
(Cummins et al. 2012b JDS)

Genetic Improvement in Fertility (IRL)



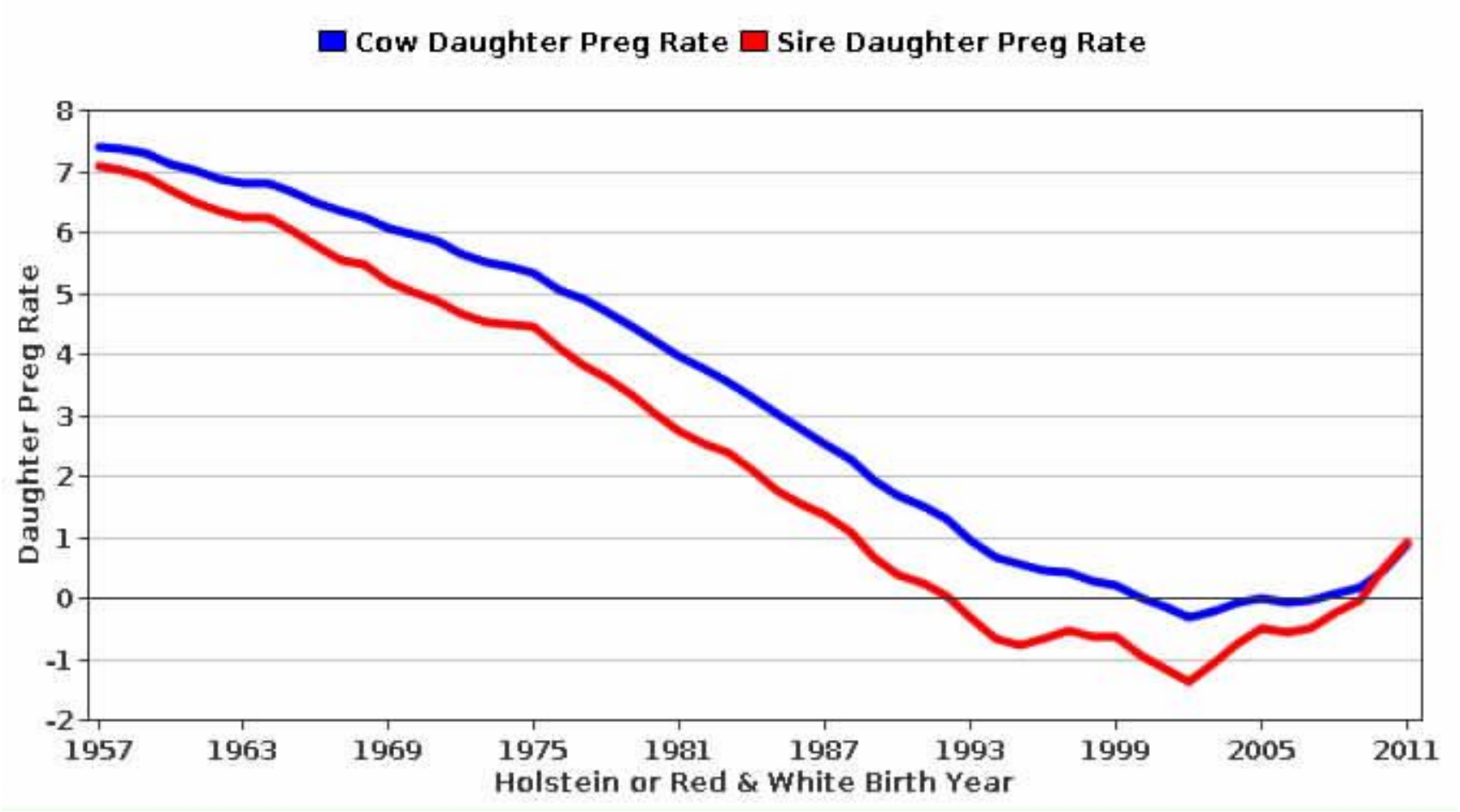
Wall et al., JDS, 2003

(Genetic) Improvement in Fertility (UK)

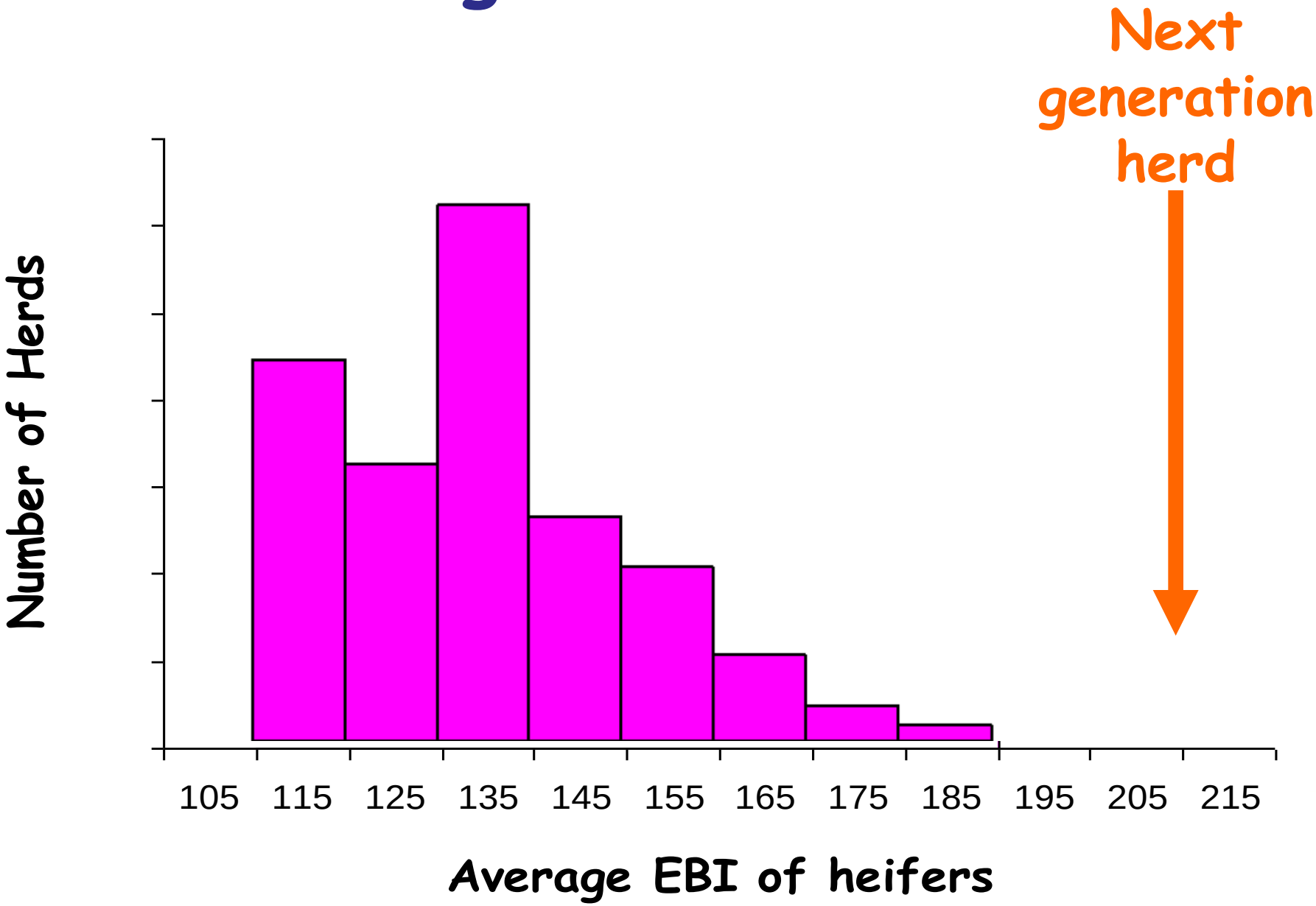


DairyCo breeding+ Sept, 2009

Genetic Improvement in Fertility (USA)



So how long will it take….



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THANK YOU !

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