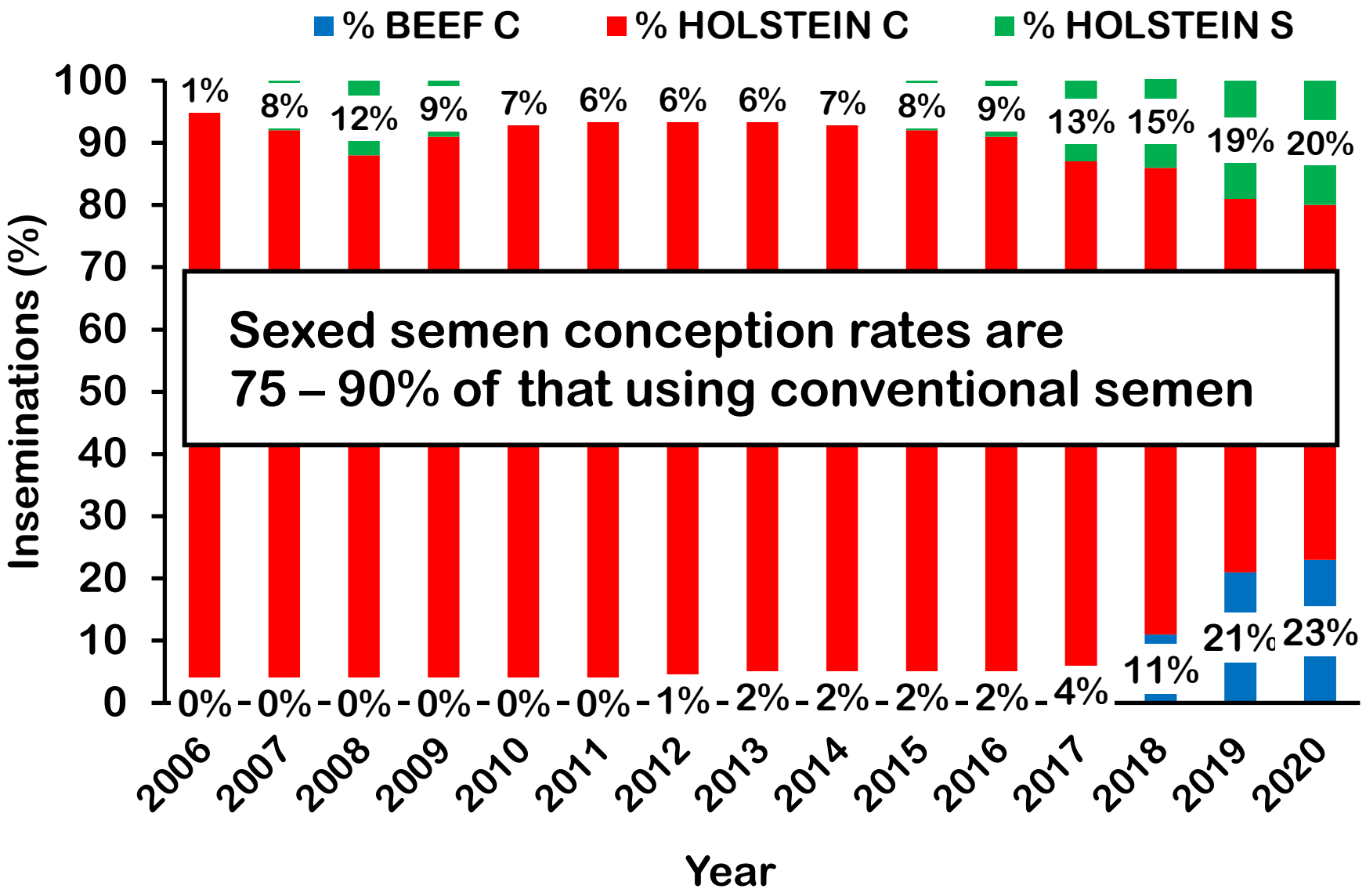
Effect of timing of induction of ovulation relative to timed artificial insemination using sexed semen on pregnancy outcomes in primiparous Holstein cows

ANIMAL & DAIRY SCIENCES
University of Wisconsin-Madison

Megan R. Lauber, B. McMullen, J.J. Parrish, and P.M. Fricke

Questions? Email : mrlauber@wisc.edu

Inseminations in Holstein Females



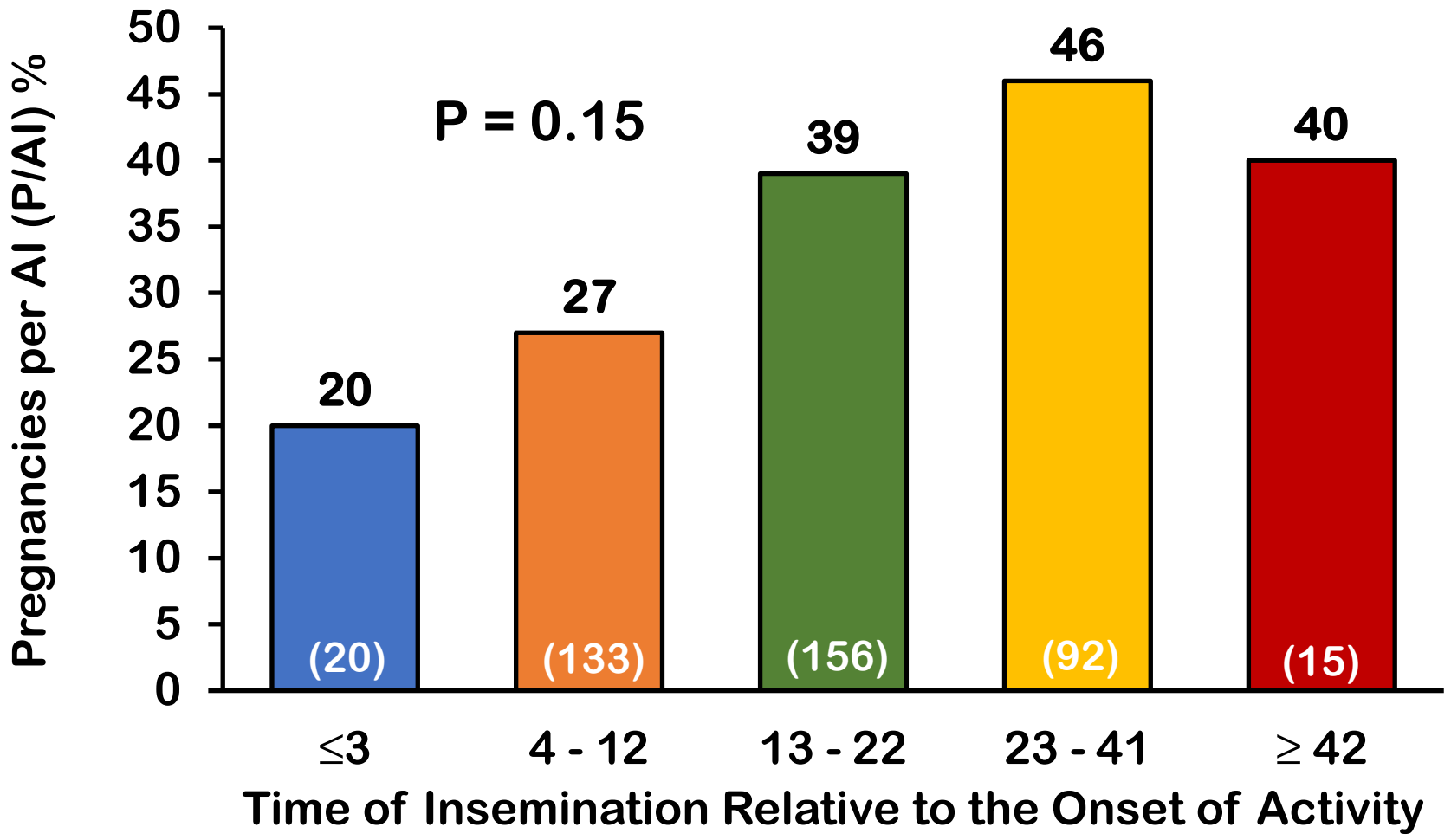
(AgSource 2020; Chebel and Cunha 2020; Karakaya-Bilen et al., 2019)

Time of insemination relative to reaching activity threshold is associated with pregnancy risk when using sex-sorted semen for lactating Jersey cows

Gabriel D. Bombardelli [a,b], Henrique F. Soares [a,b], Ricardo C. Chebel [a,b,*]

[a] Department of Large Animal Clinical Sciences, University of Florida, Gainesville, Florida, USA
[b] Department of Animal Sciences, University of Florida, Gainesville, Florida, USA

66 ± 3 d



New Idea

Inseminating later relative to the onset of activity or estrus will lead to increased fertility with sexed semen

- **May be the case when inseminating cows based on estrus or increased activity**
- **This idea has not been tested in a synchronized breeding protocol in which timing of ovulation is precisely controlled**

(Bombardelli et al., 2016; Nebel 2018)

Hypothesis

Earlier induction of ovulation relative to TAI within a Double-Ovsynch protocol (i.e., inseminating closer to the time of ovulation) would increase pregnancies per AI (P/AI)

Collaborating Farms

- Three locations:
  - Nebraska, Ohio, Wisconsin
- Primiparous cows only (n = 730)
- All farms submitted cows for first Timed AI using a Double-Ovsynch protocol
  - Farm A: 6,650 cows; ME305 = 11,318 kg.
  - Farm B: 1,800 cows; ME305 = 12,954 kg.
  - Farm C: 2,260 cows; ME305 = 14,091 kg.

Standard Double-Ovsynch Protocol

G2 to TAI = 16 h

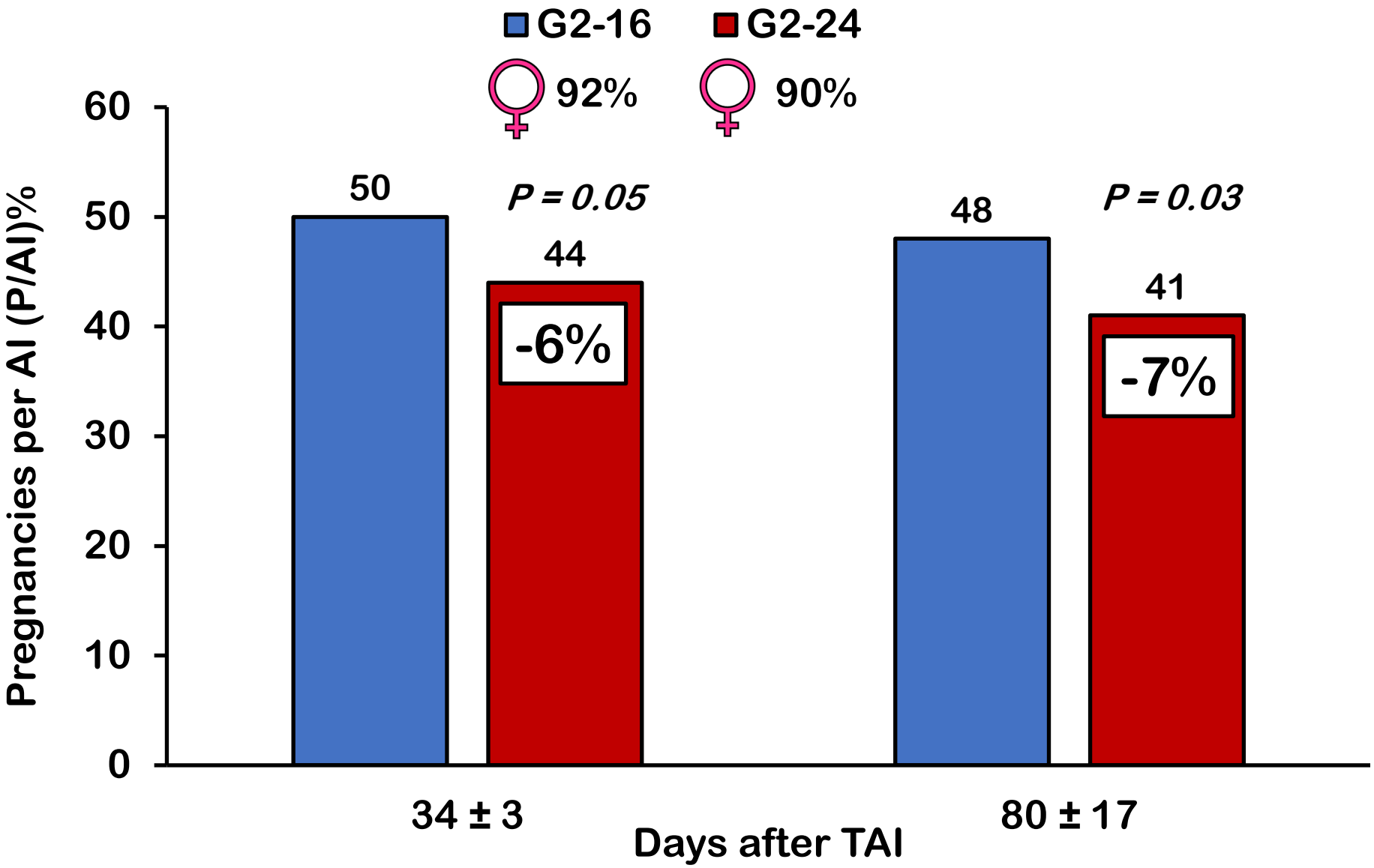
Sun	Mon	Tue	Wed	Thu	Fri	Sat
					GnRH a.m.	
					$PGF_{2\alpha}$ a.m.	
	GnRH a.m.					
	GnRH a.m.		G2-16			
	$PGF_{2\alpha}$ a.m.	$PGF_{2\alpha}$ a.m.	G2 p.m.	TAI a.m.		

Modified Double-Ovsynch Protocol

G2 to TAI = 24 h

Sun	Mon	Tue	Wed	Thu	Fri	Sat
					GnRH a.m.	
					$PGF_{2\alpha}$ a.m.	
	GnRH a.m.					
	GnRH a.m.		G2-24			
	$PGF_{2\alpha}$ a.m.	$PGF_{2\alpha}$ a.m.	G2 a.m.	TAI a.m.		

Effect of Treatment on Pregnancy Outcomes



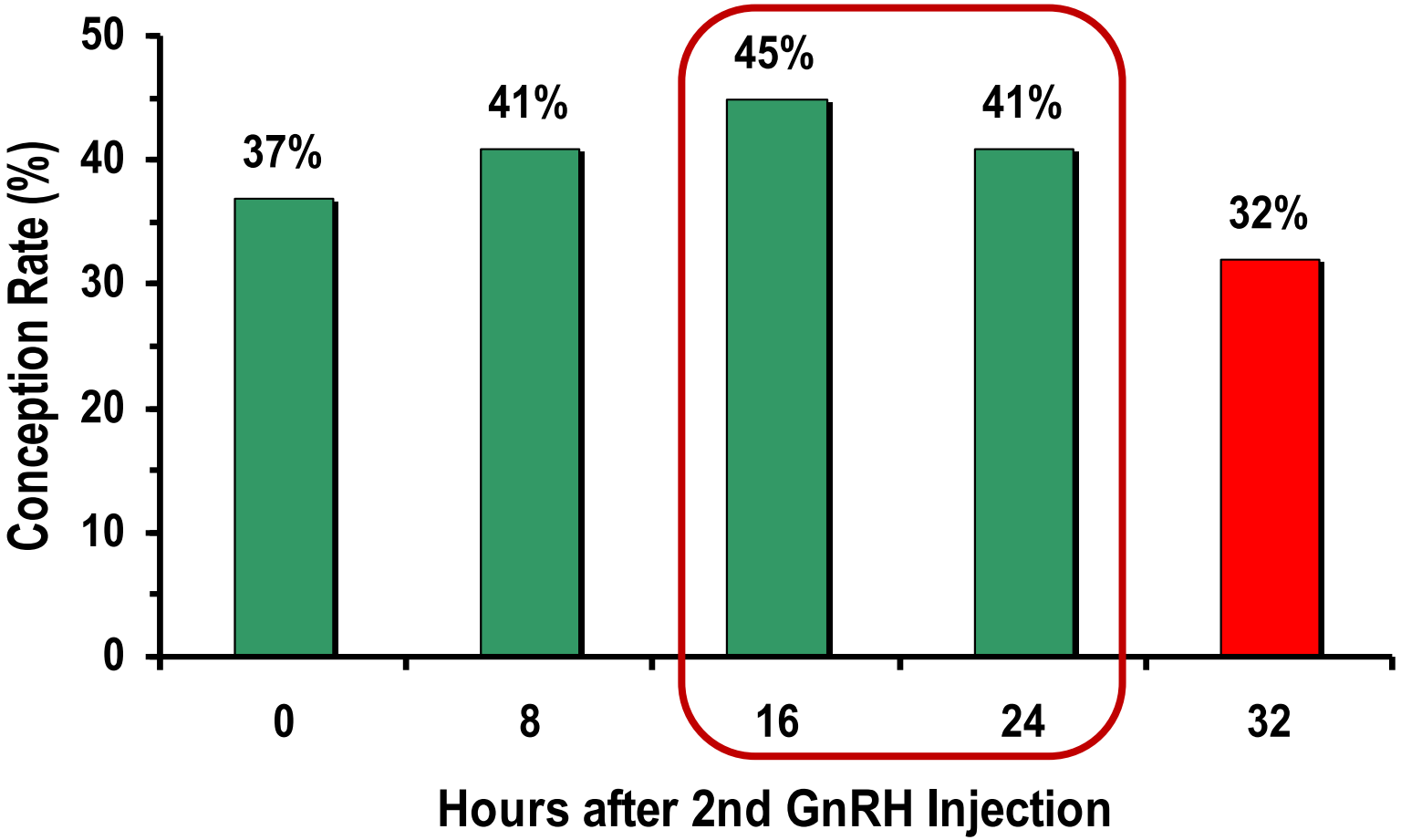
Factors Affecting Fertility

- Time for sperm transport and capacitation
  - G2-16 cows: 8 to 16 h ; G2-24 cows: 0 to 8 h
  - Sustained transport requires 8 to 12 h
- Time for luteolysis
  - G2-24 cows had 8 fewer hours than G2-16 cows
    - Altered estradiol and progesterone concentrations
- Ovulatory follicle size
  - G2-24 cows likely ovulated smaller follicles because they had 8 fewer hours to develop during the synchronized follicular wave than G2-16 cows

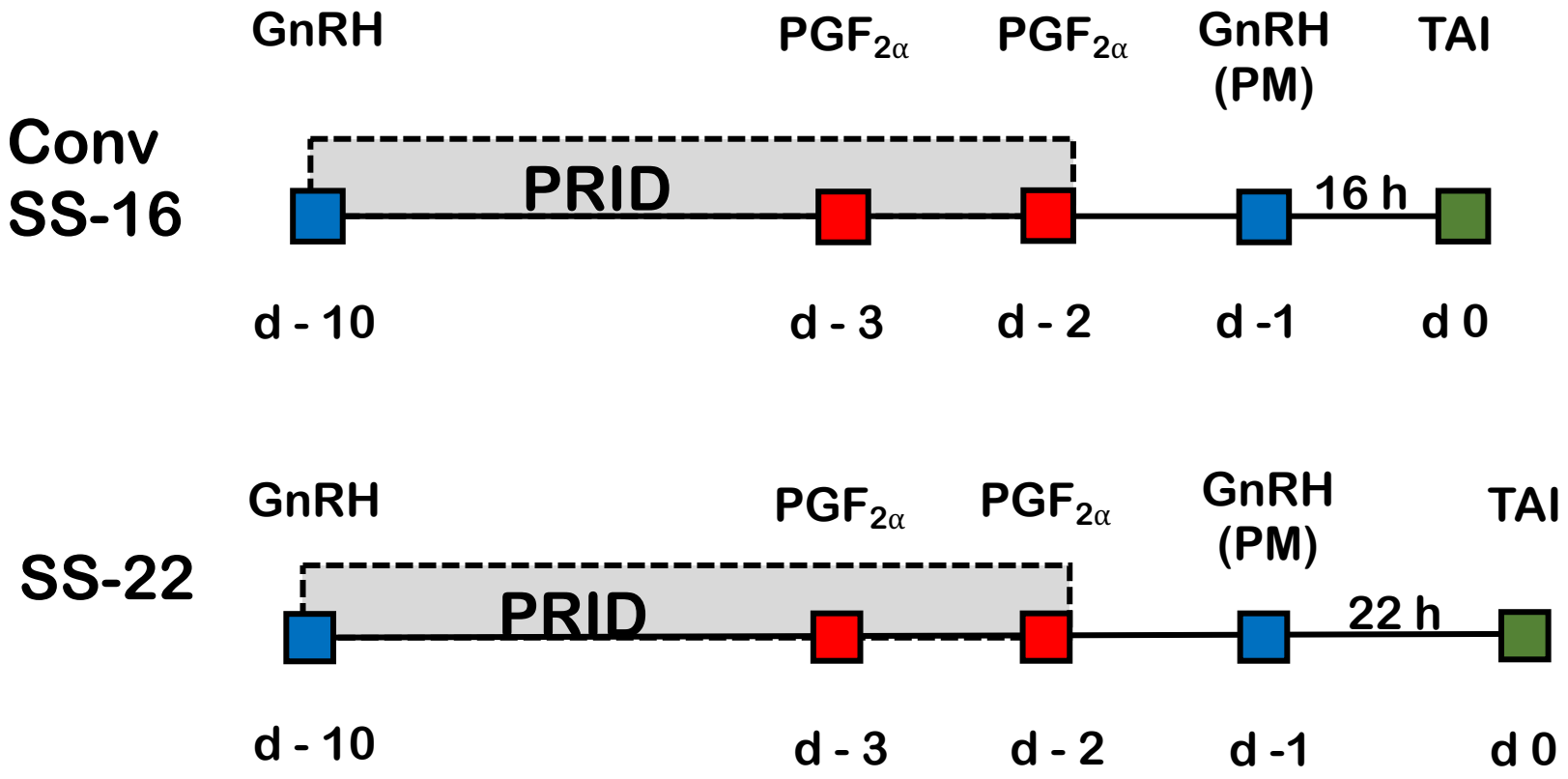
Effect of Time of Artificial Insemination on Pregnancy Rates, Calving Rates, Pregnancy Loss, and Gender Ratio After Synchronization of Ovulation in Lactating Dairy Cows

J. RICHARD PURSLEY,*,[1] ROY W. SILCOX,† and MILO C. WILTBANK*,[2]
*Department of Dairy Science, University of Wisconsin, Madison 53706
†Department of Animal Science, Brigham Young University, Provo, UT 84602

1998 J Dairy Sci 81:2139–2144



Does timing of AI affect P/AI in seasonal-calving, pasture-based lactating dairy cows inseminated with sex-sorted sperm?



Drake et al., 2020

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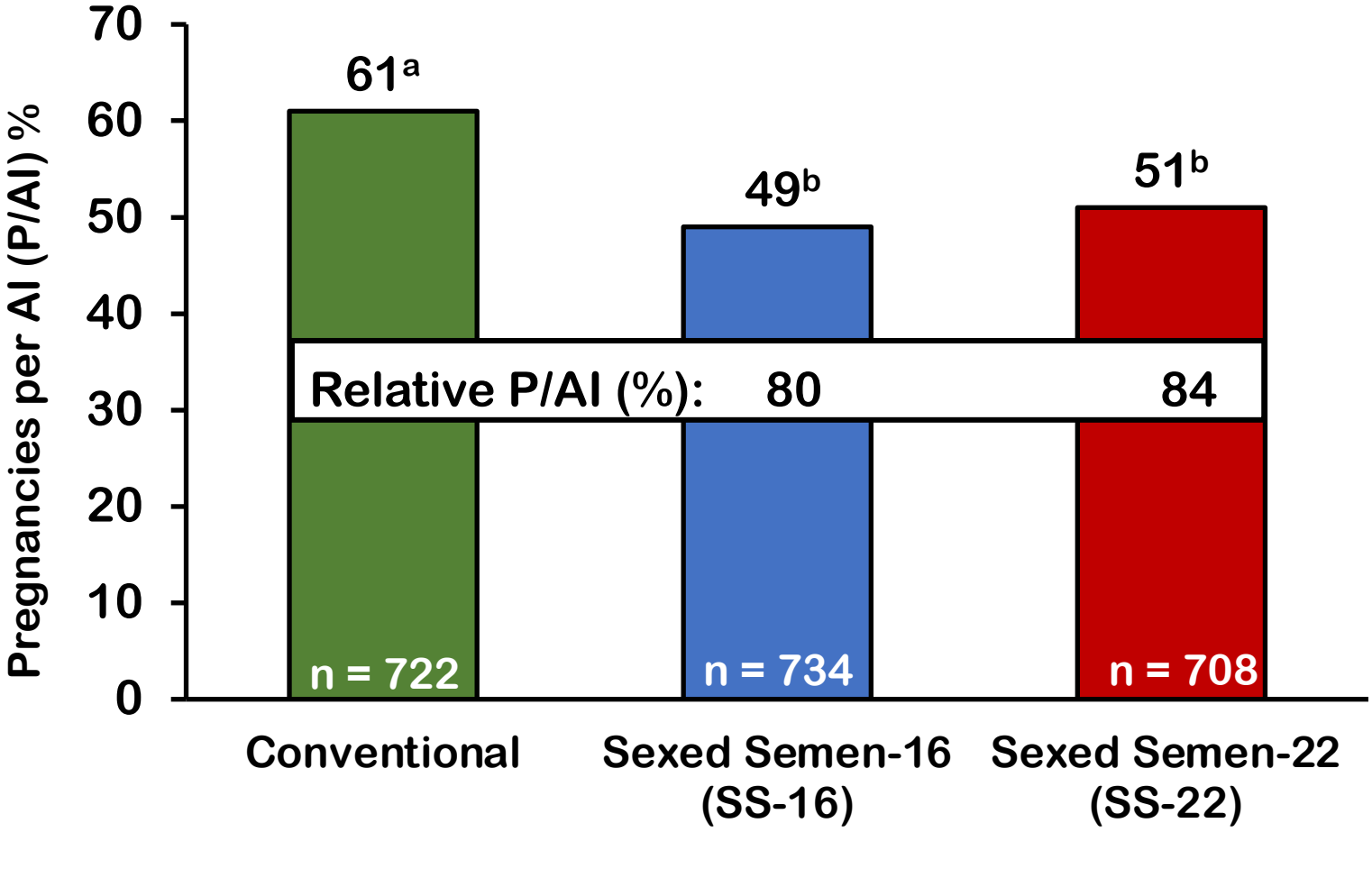

Drake et al., 2020

Conclusion

Delaying insemination using sexed semen relative to earlier induction of ovulation in a synchronized ovulation protocol decreased fertility in primiparous Holstein cows

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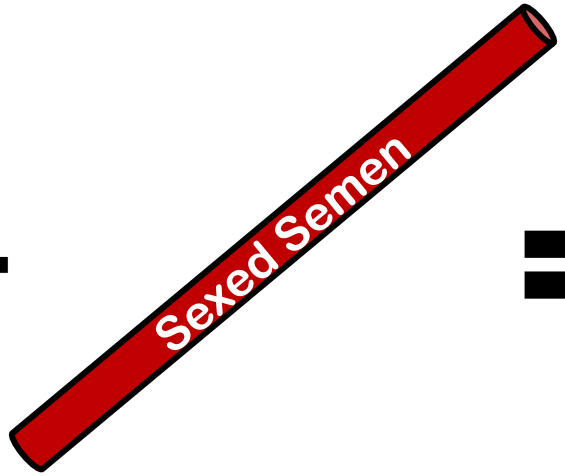

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Questions?

Mooving Forward.

Megan Lauber
Graduate Research Assistant
Dairy Reproductive Physiology
Lab of Dr. Paul Fricke
mrlauber@wisc.edu