



The High Fertility Cycle

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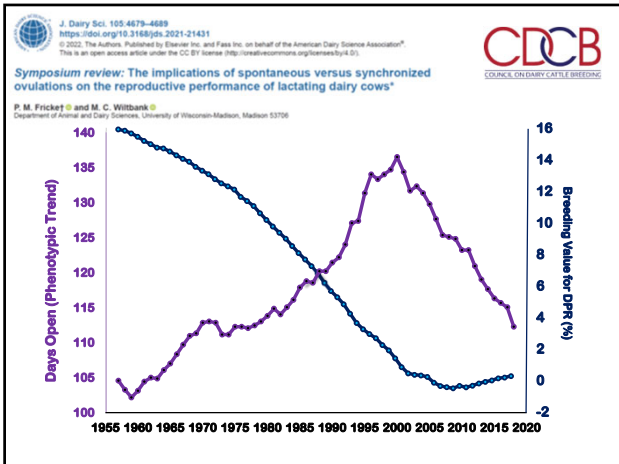


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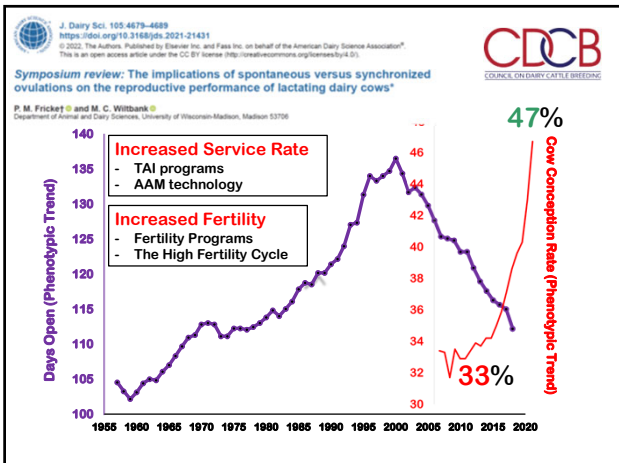


Extension
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J. Dairy Sci. 105:4679–4689
<https://doi.org/10.3168/jds.2021-21431>
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Symposium review: The implications of spontaneous versus synchronized ovulations on the reproductive performance of lactating dairy cows*

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P/AI of lactating Holstein cows based onprelety or mostly on AI after estrus vs. timed AI after submission to various protocols for first insemination.

Study	TAI Protocol	P/AI (%)		P-value	Δ (%)
		Estrus	TAI		
Pursley et al., 1997a	Ovsynch	39	37	NS	-
Pursley et al., 1997b	Ovsynch	39	38	NS	-
Chebel & Santos, 2010	Presynch-Ovsynch	33	40	0.14	-
Strickland et al., 2010	Presynch-Ovsynch	31	44	<0.01	+42
Gumen et al., 2012	Presynch-Ovsynch	36	60	<0.05	+67
Fricke et al., 2014	Presynch-Ovsynch	32	40	<0.01	+25
Santos et al., 2017	Double-Ovsynch	39	49	<0.05	+26
Sitko et al., 2023	Double-Ovsynch	49	58	<0.01	+18

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J. Dairy Sci. 100:8507–8517
<https://doi.org/10.3168/jds.2017-13210>
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Fertility of lactating Holstein cows submitted to a Double-Ovsynch protocol and timed artificial insemination versus artificial insemination after synchronization of estrus at a similar day in milk range

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Double-Ovsynch

n=294

Estrus

n=284

SR=100%
% pregnant cows at 110 DIM: 49 vs. 30 SR=78%

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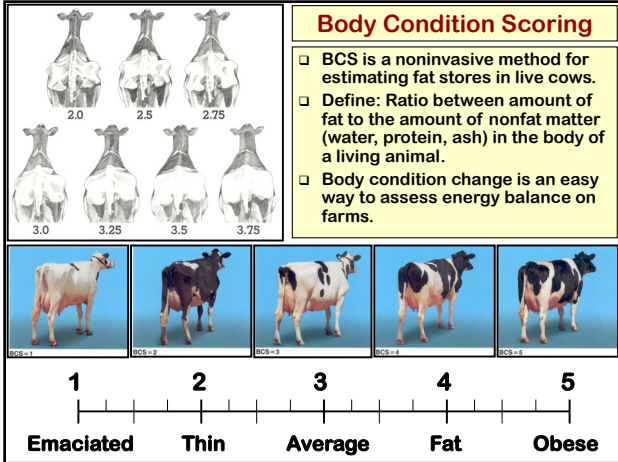
JDS Communications® | <https://doi.org/10.3168/jds.2022-0280>
 2022; 3 | Mini-Review | Physiology

Mini-Review: The high fertility cycle
 P. M. Fricke,¹ M. C. Wiltbank,¹ and J. R. Pursley²

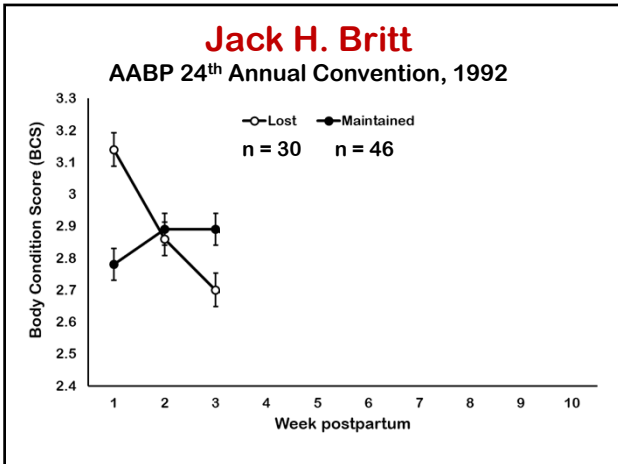
Graphical Abstract

THE HIGH FERTILITY CYCLE

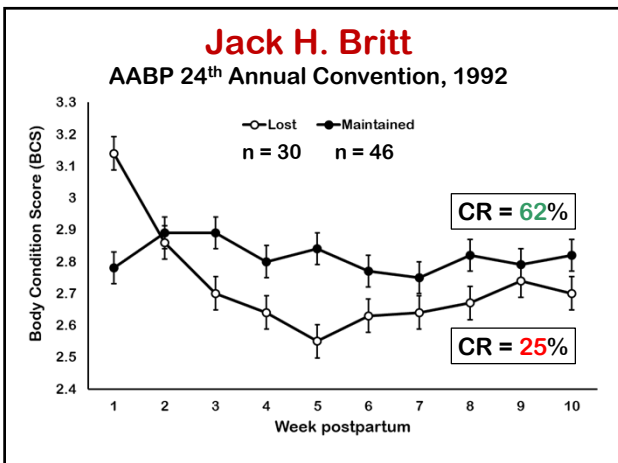
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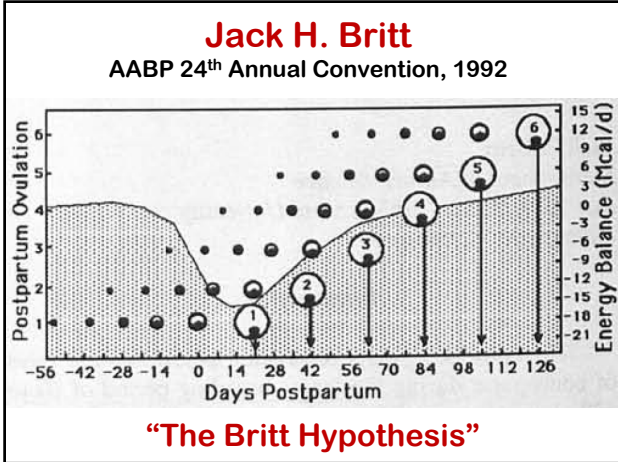
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Three Studies:
Relationships among changes in body condition score (BCS) and reproduction in lactating dairy cows

- **Carvalho et al., 2014**
J. Dairy Sci. 97:3666-3683
- **Barletta et al., 2017**
Theriogenology 104:30-36
- **Middleton et al., 2019**
J. Dairy Sci. 102:5577-5587

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J. Dairy Sci. 97:3666–3683
<http://dx.doi.org/10.3168/jds.2013-7809>
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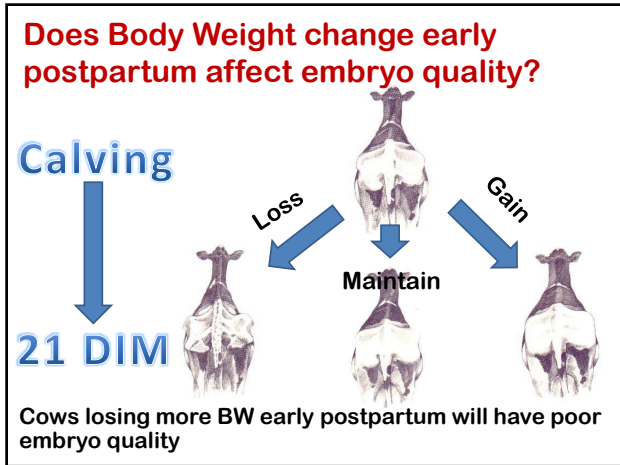
Relationships between fertility and postpartum changes in body condition and body weight in lactating dairy cows

P. D. Carvalho,* A. H. Souza,*¹ M. C. Amundson,* K. S. Hackbart,* M. J. Fuenzalida,* M. M. Herlihy,* H. Ayres,* A. R. Dresch,* L. M. Vieira,* J. N. Guenther,* R. R. Grummer,† P. M. Fricke,* R. D. Shaver,* and M. C. Wiltbank*²

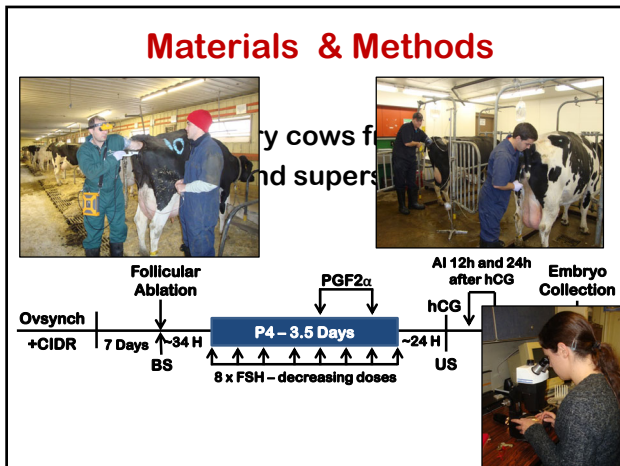
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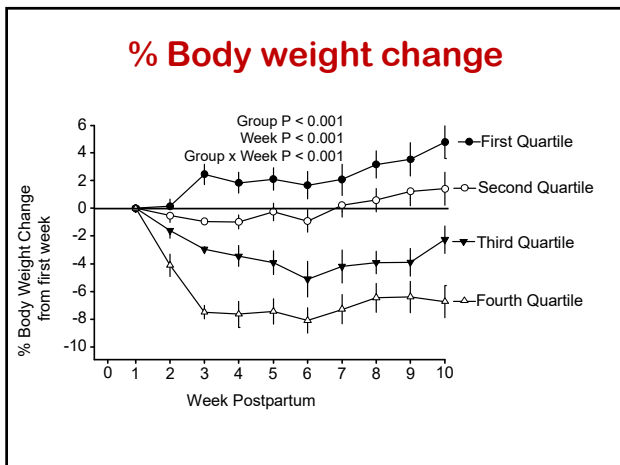
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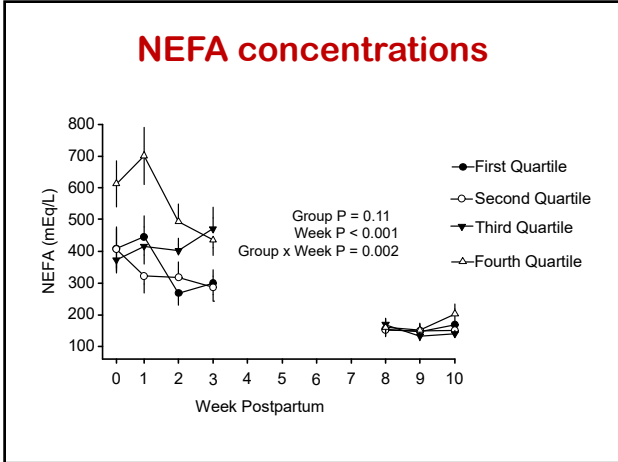
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Embryo Characteristics

	Quartile				P-value
	Fourth Q Lost +	Third Q Lost	Second Q Maintain	First Q Gain	
CL (no.)	18.4 ± 2.6	18.4 ± 1.7	19.0 ± 1.7	16.0 ± 2.0	0.67
Fertilized embryos (%)	76.9 ± 7.1	77.0 ± 6.6	77.6 ± 7.6	78.4 ± 7.1	0.99
Quality 1 & 2 embryos (%)	38.0 ± 8.7	61.3 ± 8.2	60.6 ± 9.4	63.4 ± 8.6	0.14
Degenerate embryos (%)	35.2 ± 8.5 ^a	12.6 ± 4.6 ^b	14.5 ± 6.3 ^b	9.6 ± 3.7 ^b	0.02
Qual 1 & 2 of Fertilized (%)	48.4 ± 9.5 ^a	78.3 ± 6.6 ^b	72.6 ± 9.5 ^b	77.7 ± 7.4 ^b	0.05
Degenerate of Fertilized (%)	46.9 ± 9.6 ^{a,A}	17.4 ± 6.4 ^{b,B}	24.8 ± 9.3 ^{ab,A}	16.2 ± 7.0 ^{b,B}	0.04

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J. Dairy Sci. 93:1596–1603
doi:10.3168/jds.2009-2852
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Associations of elevated nonesterified fatty acids and β-hydroxybutyrate concentrations with early lactation reproductive performance and milk production in transition dairy cattle in the northeastern United States

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*Department of Animal Science, College of Agriculture and Life Sciences, and †Department of Population Medicine and Diagnostic Sciences, College of Veterinary Medicine, Cornell University, Ithaca, NY 14853

- Cows from 91 dairy herds were sampled for NEFA and BHBA prepartum (n = 1,164) or postpartum (n = 1,095).
- Cows with NEFA concentrations > 0.27 mEq/L resulted in **16% decreased risk** of conception within 70 d after the VWP (P = 0.05).

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Does a change in BCS early postpartum affect fertility to TAI?

Calving
↓
21 DIM

Lost Maintained Gained

Cows losing more BCS early postpartum will have decreased fertility at first TAI

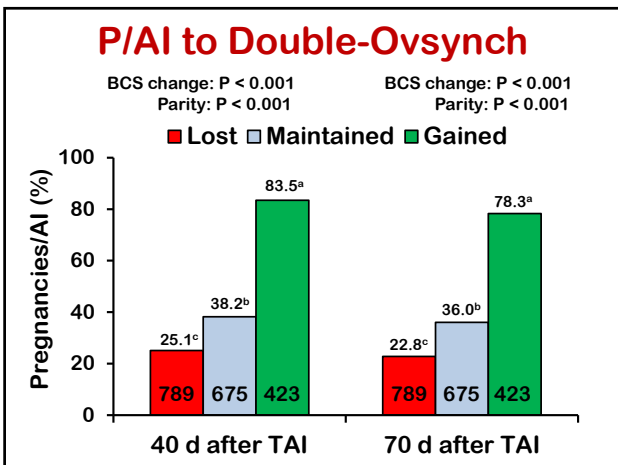
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% of cows, BCS at calving and 21 DIM

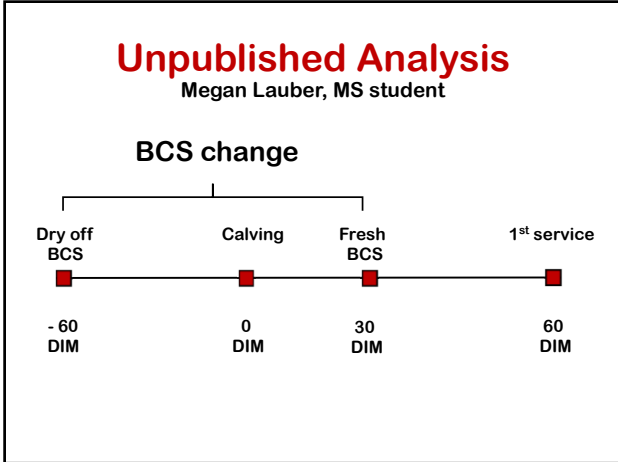
	BCS Change			P-Value BCS
	Lost	Maintained	Gained	
% cows	42 (789/1887)	36 (675/1887)	22 (423/1887)	-
% Primi.	47 (373/789)	53 (356/675)	55 (233/423)	0.02
BCS at calving	2.93±0.01 ^a	2.89±0.02 ^{ab}	2.85±0.02 ^b	0.005
BCS at 21 DIM	2.64±0.01 ^c	2.89±0.02 ^b	3.10±0.02 ^a	<0.001
BCS Δ	-0.29	0.0	+0.25	
ECM (kg/d) ¹	30.9±0.4	31.5±0.4	28.7±0.4	0.3

¹From calving to 21DIM

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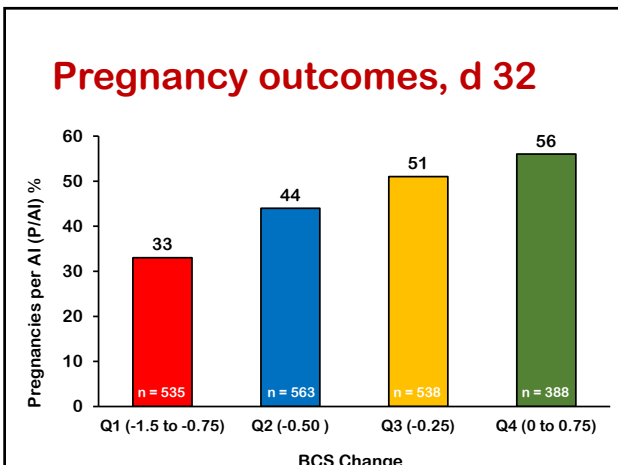


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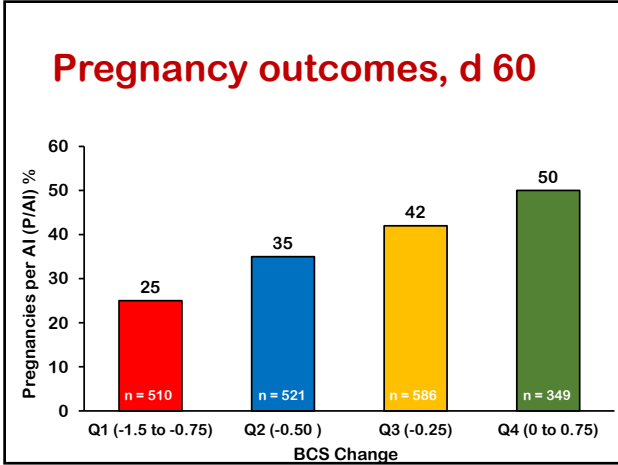
Demographics by BCS change

	BCS Change from Dry off to 30 DIM			
	Q1 n = 608	Q2 n = 672	Q3 n = 650	Q4 n = 449
BCS Change	-1.5 to -0.75	- 0.50	-0.25	0 to 0.75
BCS Change (Mean ± SEM)	-0.84 ± 0.01	-0.50 ± 0	-0.25 ± 0	0.04 ± 0.01
Parity (Mean ± SEM)	3.47 ± 0.06	3.07 ± 0.05	2.86 ± 0.5	2.73 ± 0.06
Week 8 Milk (lbs)	117	117	113	108
1 st F:P Ratio (Mean ± SEM)	1.30 ± 0.02	1.25 ± 0.01	1.21 ± 0.01	1.19 ± 0.01

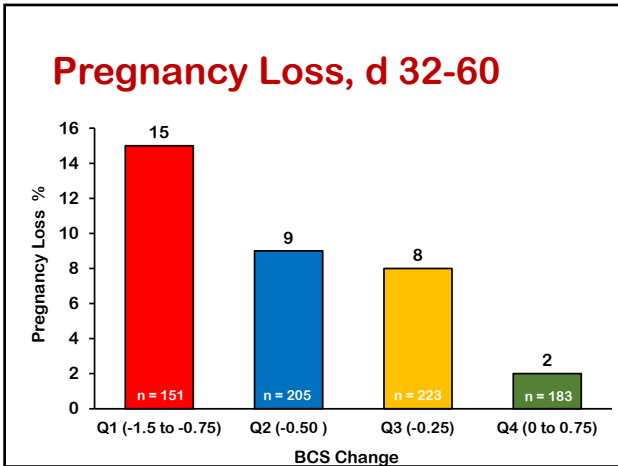
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Question:
How can we get cows to gain or maintain BCS after calving?

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Theriogenology 104 (2017) 30–36

Contents lists available at ScienceDirect

Theriogenology

ELSEVIER journal homepage: www.theriojournal.com

Association of changes among body condition score during the transition period with NEFA and BHBA concentrations, milk production, fertility, and health of Holstein cows

R.V. Barletta^{a,*}, M. Maturana Filho^b, P.D. Carvalho^c, T.A. Del Valle^b, A.S. Netto^b, F.P. Rennó^b, R.D. Mingoti^b, J.R. Gandra^d, G.B. Mourão^e, P.M. Fricke^a, R. Sartori^a, E.H. Madureira^b, M.C. Wiltbank^a

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^d College of Agricultural Science, Federal University of Ouro Preto, Ouro Preto, 70804-970, Brazil

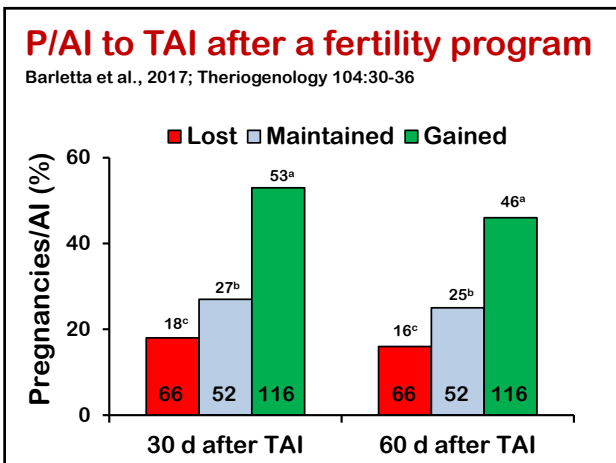
BCS change from 21 days before calving to 21 days after calving

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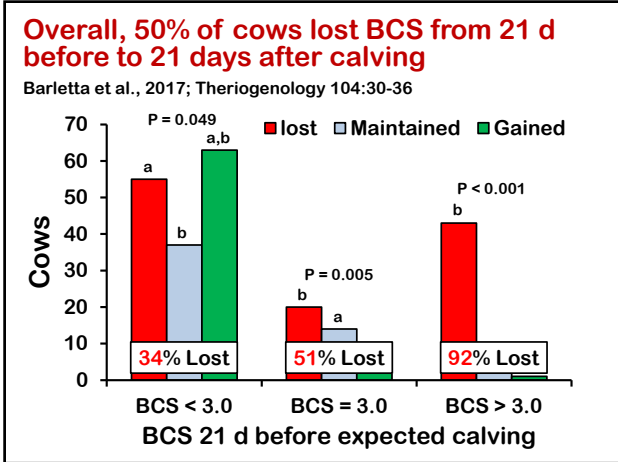
Effect of BCS Change on Health Events
 Barletta et al., 2017; Theriogenology 104:30-36.

Event	Lost	Maintained	Gained
	50% (116/234)	22% (52/234)	28% (66/234)
Metritis	23%	21%	20%
Mastitis	29% ^b	17% ^{a,b}	17% ^a
Ketosis	27%	19%	15%
Pneumonia	15%	12%	9%
>1 Event	63% ^b	46% ^a	39% ^a

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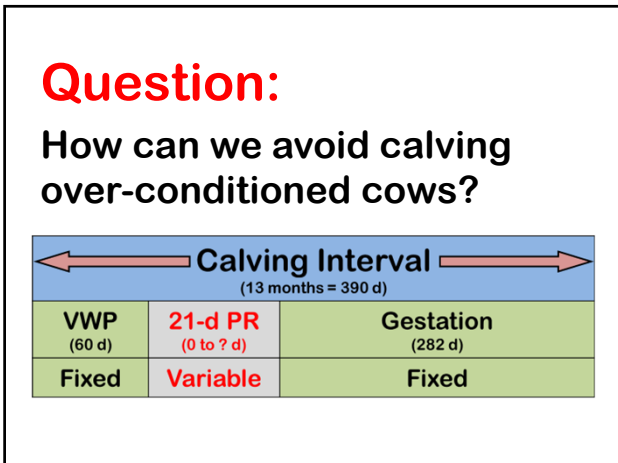


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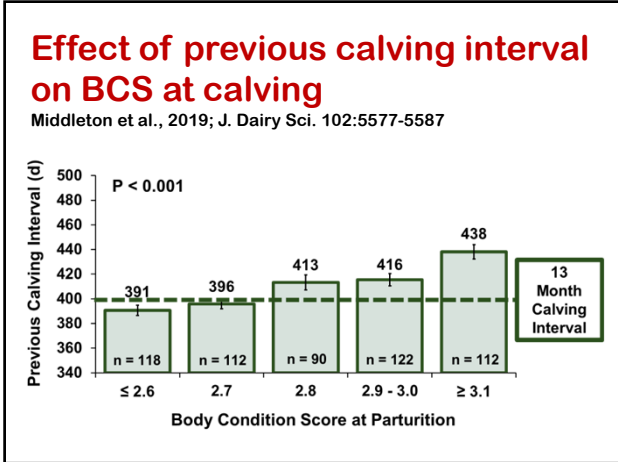
Question:
 How can we get cows to gain or maintain BCS after calving?

Answer:
 Avoid calving over-conditioned cows!

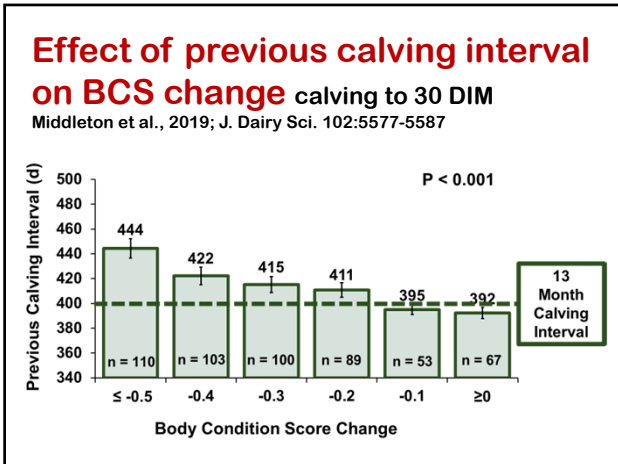
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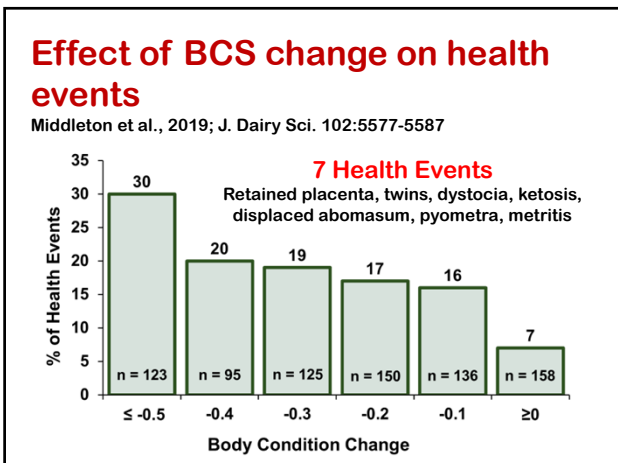
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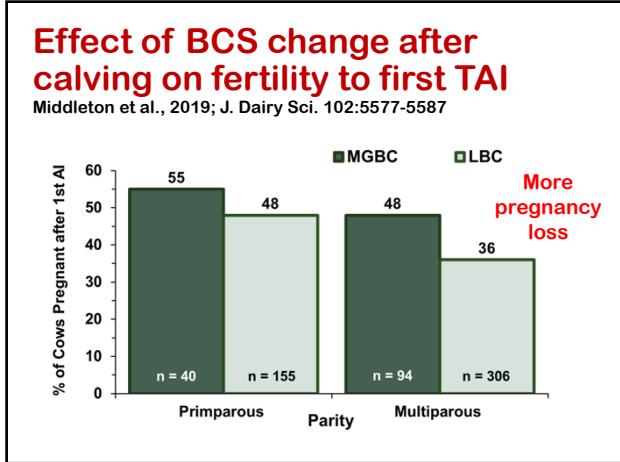
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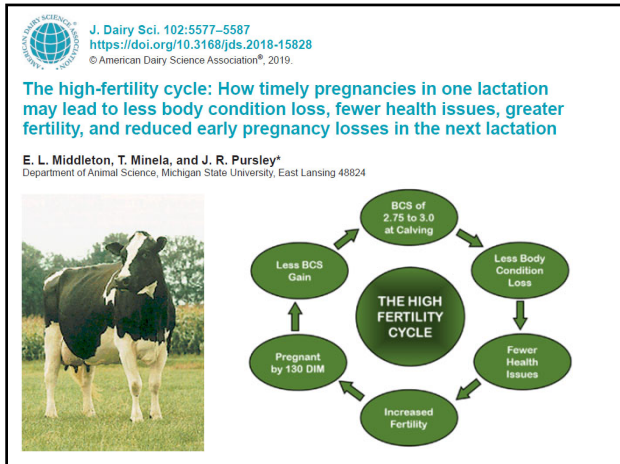
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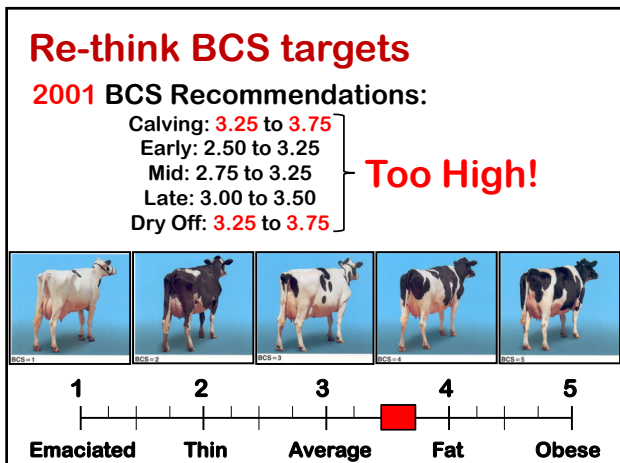
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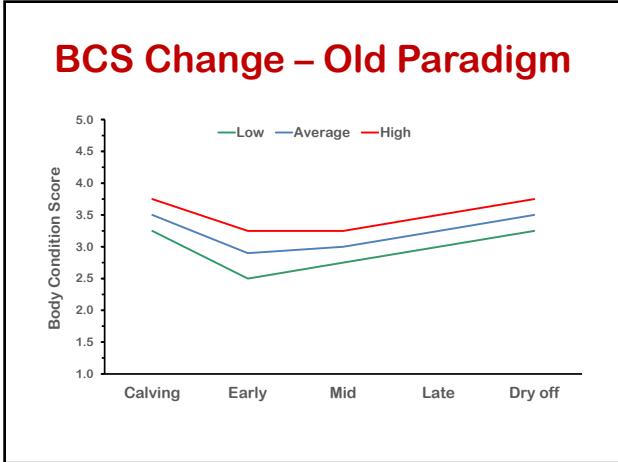
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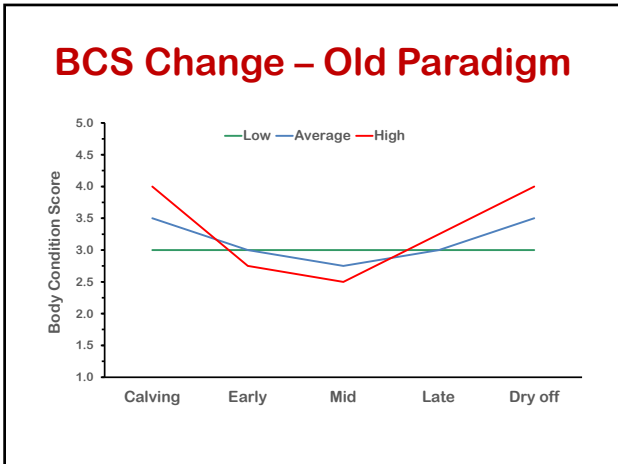
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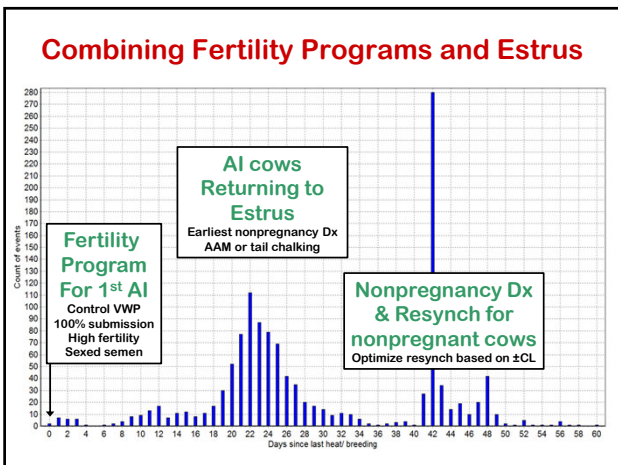
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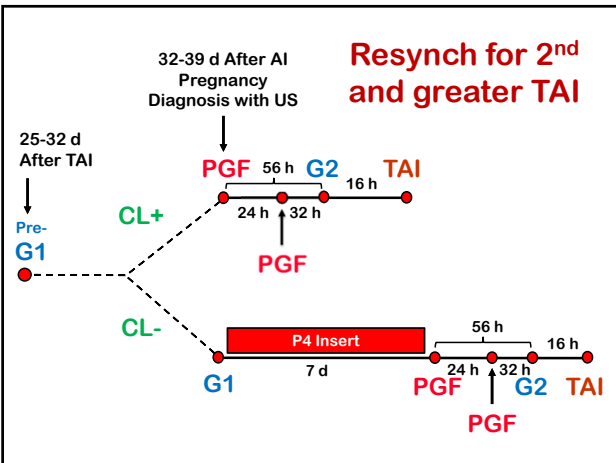


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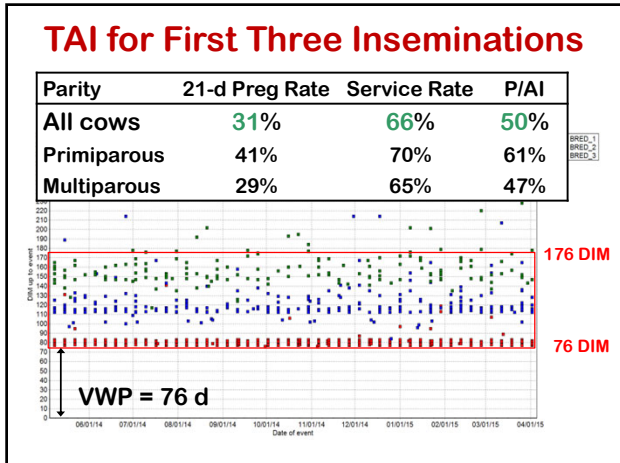
Double-Ovsynch for first TAI

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

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BREDSUM By Times Bred

January, 2019 to January, 2020

	95% CI	%Conc	#Preg	#Open	Other	Abort	Total	%Tot	SPC
1	46-55	50	269	266	5	35	540	49	2.0
2	47-58	53	153	137	4	13	294	27	1.9
3	42-58	50	75	75	1	6	151	14	2.0
4	34-57	46	31	37	1	2	69	6	2.2
5	21-54	36	10	18	0	1	28	3	2.8
6	-	62	10	6	0	0	16	1	1.6
7	-	50	1	1	0	0	2	0	2.0
8	-	100	1	0	0	0	1	0	1.0
TOTALS	47-53	50	550	540	11	57	1101	100	2.0

→ 90% pregnant after 3 AI

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