

# Association Between Age at First Calving and Economic Performance of Replacement Dairy Heifers

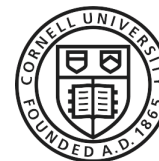
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<sup>1</sup>Department of Animal Science, Cornell University, Ithaca, NY, USA

<sup>2</sup>Dairy Health & Management Services, Lowville, NY, USA

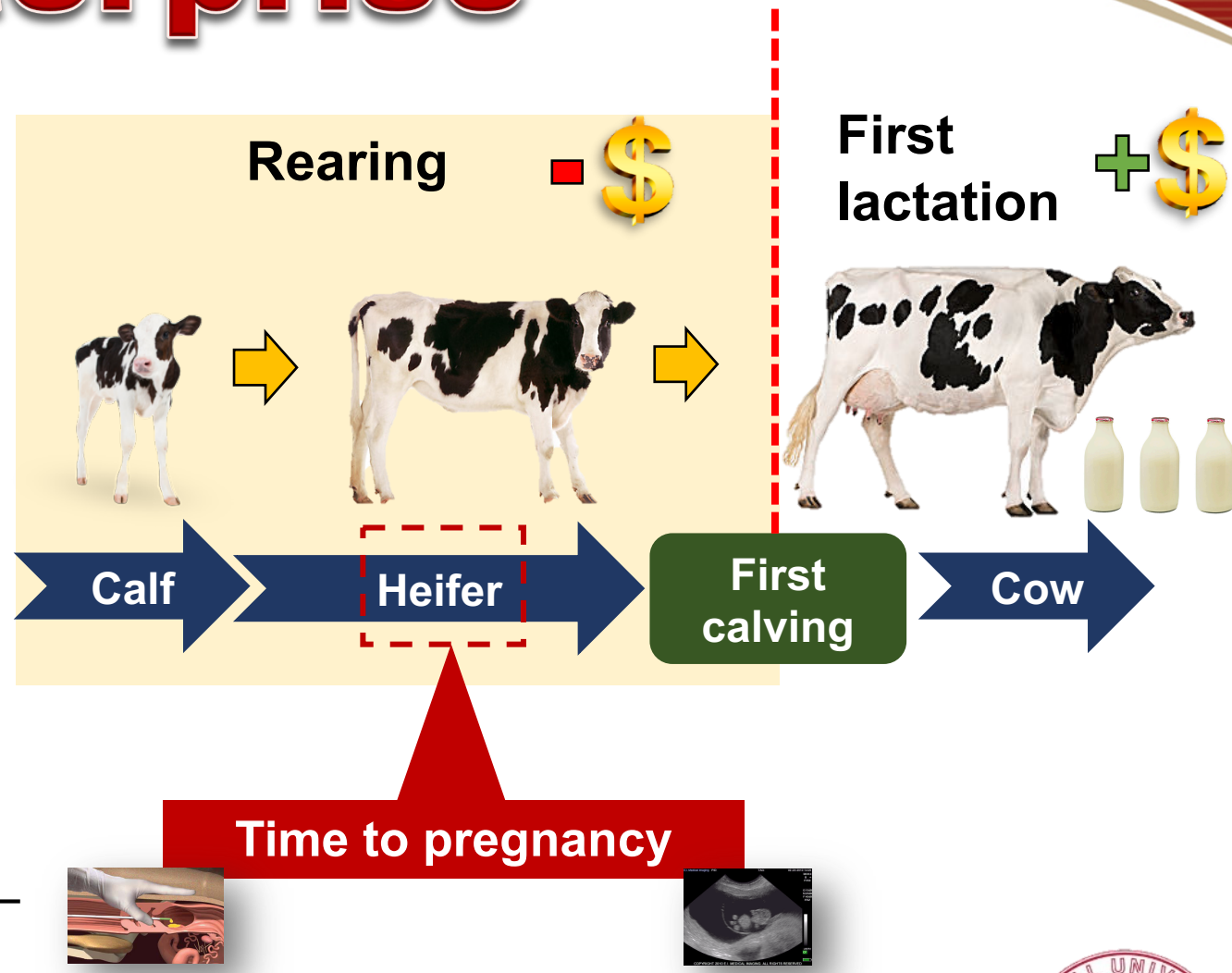
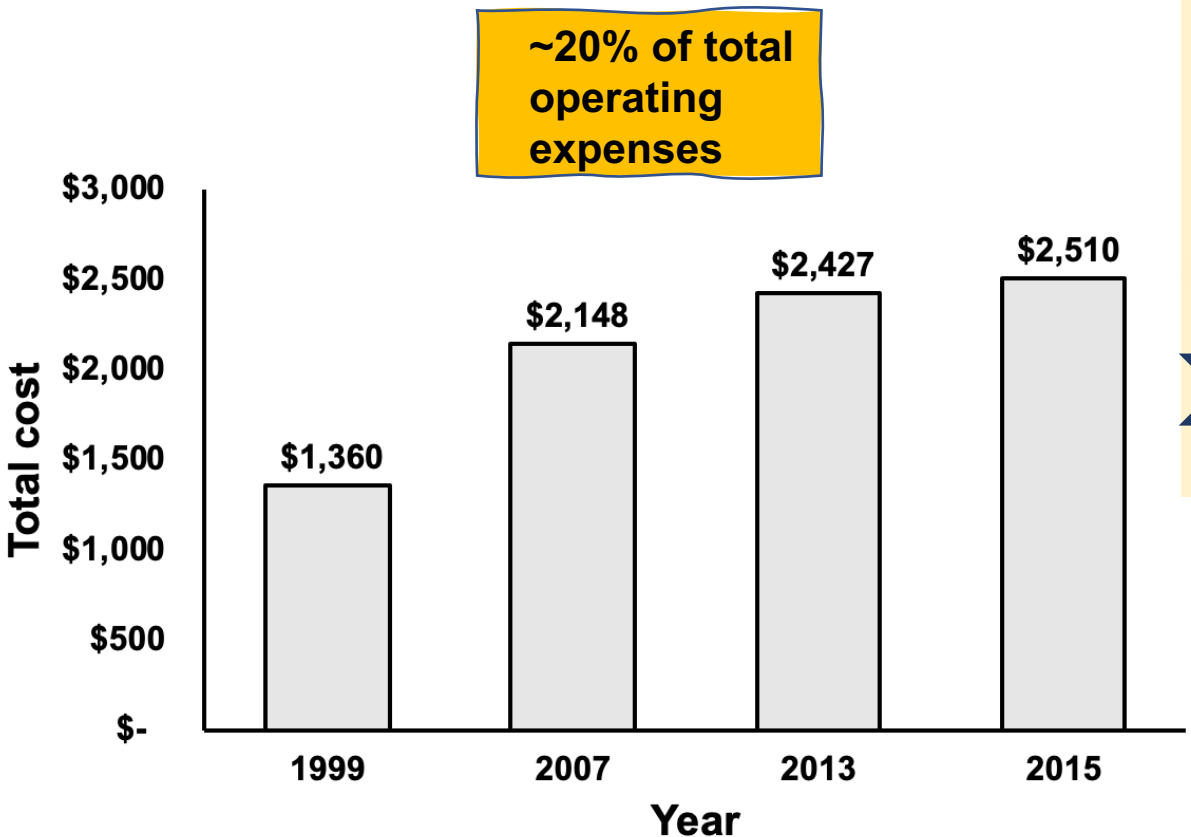
## Take home message:

Profitability of replacement heifers increases as age at first calving decreases

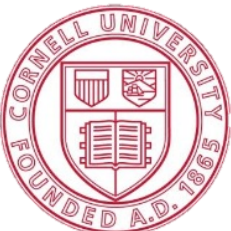


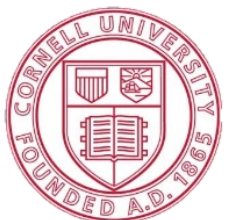
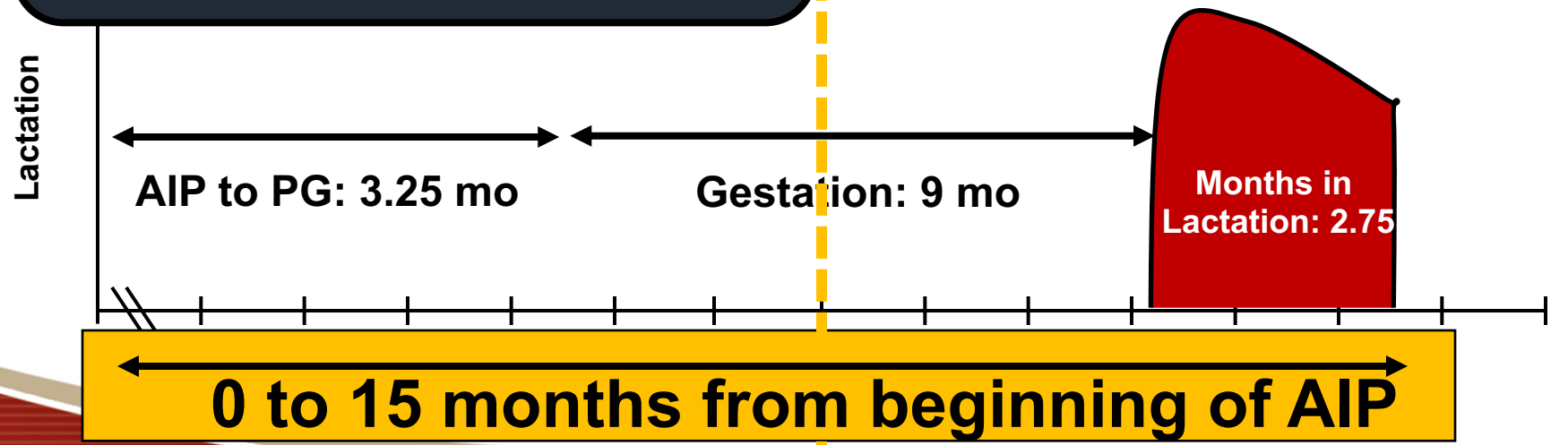
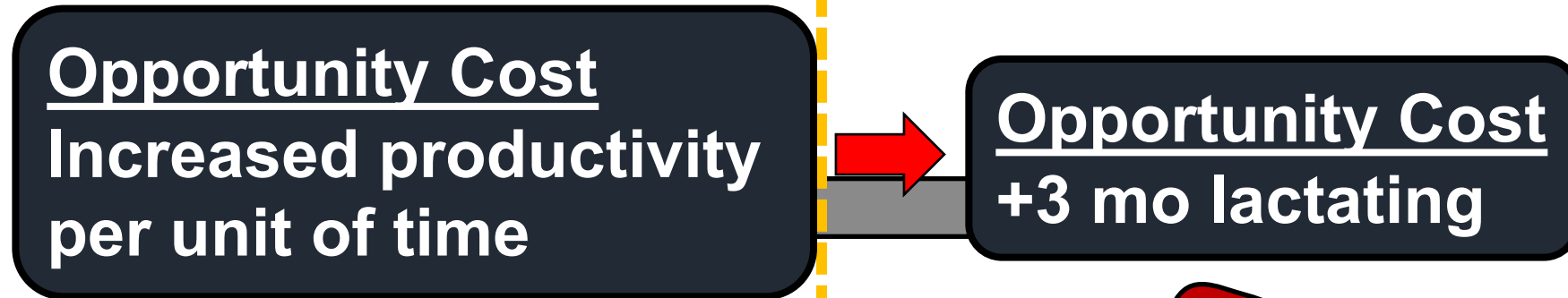
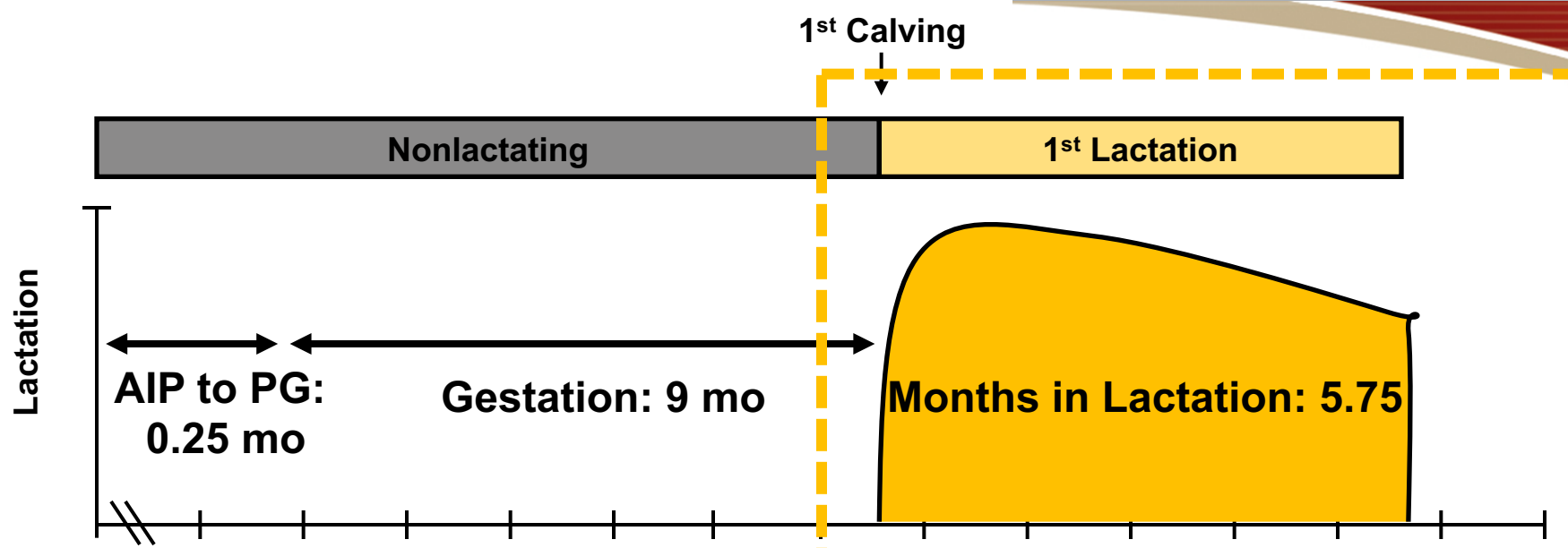
**Cornell CALS**  
College of Agriculture and Life Sciences

# The Heifer Enterprise



Adapted from Akins and Hagedorn, UW-Extension, 2015





Greater age at first calving (AFC), may result in increased rearing cost and a delay in achieving positive cash flow via milk production



Hypothesis:

Reduced AFC will be associated with improved economic performance of Holstein replacements

## Objective:

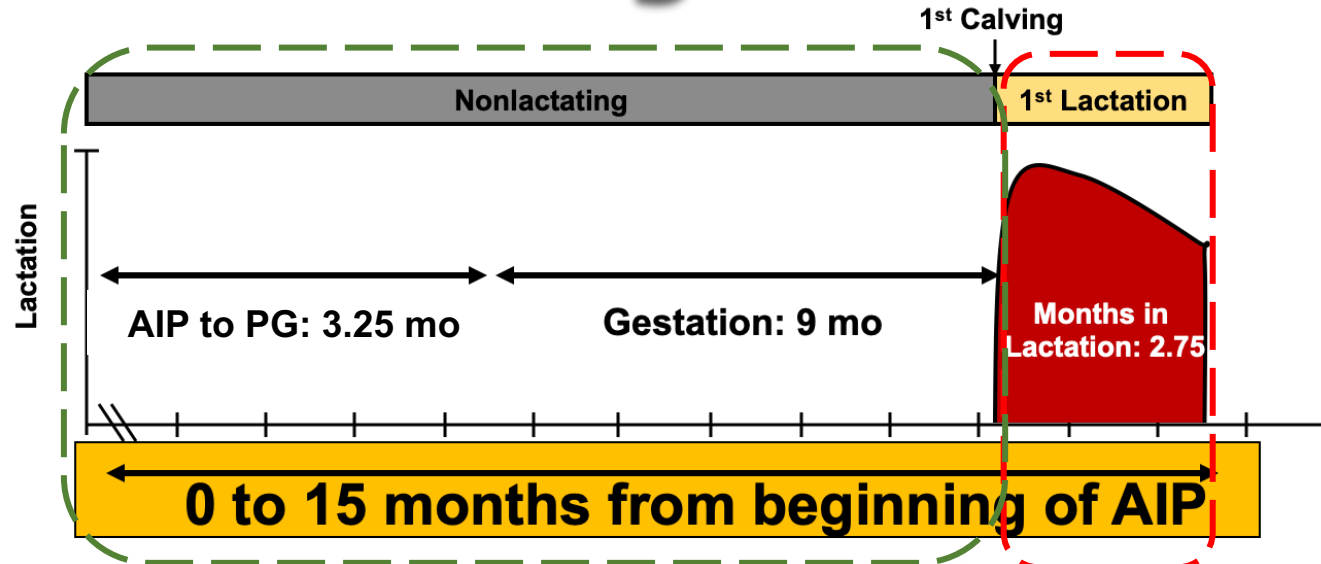
Evaluate the association between AFC and the economic performance of Holstein replacements

- ❑ Nulliparous Holstein heifers from 3 commercial farms in NY (n = 1,144)
- ❑ Eligible for AI at  $368 \pm 10$  days (12 mo) of age
- ❑ First AI with sexed semen, 2<sup>nd</sup> and greater AI with conventional semen
- ❑ After calving, heifers were **retrospectively** assigned to 1 of 3 groups based on AFC tertiles within farm:
  - Low (n = 391; 20.2 to 21.8 mo)**
  - Medium (n = 376; 21.4 to 22.8 mo)**
  - High (n = 377; 22.1 to 28.7 mo)**



# Economic Analysis \$

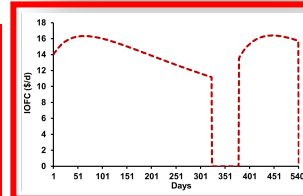
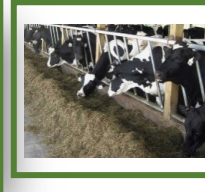
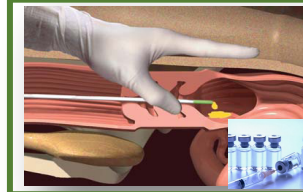
AIP = artificial insemination period



Cash flow rearing period = Repro cost + Feed cost + Replacement Cost + Other operating expenses

Cash flow lactating period = IOFC + Calf value + Replacement Cost + Other operating expenses

Cash flow (\$/slot/15 mo)



# Statistical Analyses

**Logistic Regression (PROC GLIMMIX)**  
used to analyze **binary** response data  
(conception)

**Linear Mixed Model (PROC MIXED)** were  
used to analyze **continuous outcomes**  
(Costs, cash flow)

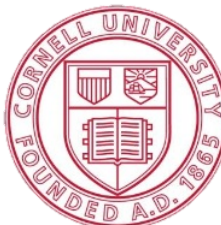


Farm was included as  
a random effect in all  
models

# Results

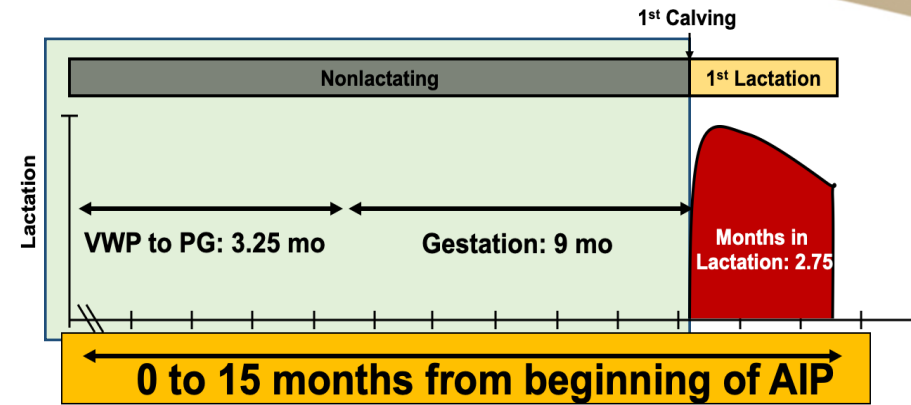
- Differences in AFC among groups were explained by differences in age and P/AI at first service.

	AFC group			
	Low (n = 391)	Medium (n = 376)	High (n = 377)	P-value
Age 1 <sup>st</sup> AI (d)	371 ± 0.5 <sup>a</sup>	376 ± 0.5 <sup>a</sup>	378 ± 0.5 <sup>b</sup>	<0.01
P/AI 1 <sup>st</sup> AI	95.9% <sup>a</sup>	33.2% <sup>b</sup>	0.3% <sup>c</sup>	<0.01



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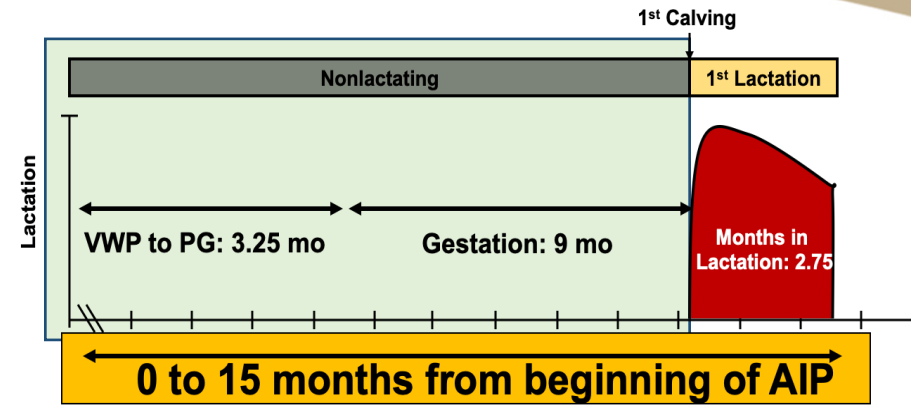
## “Rearing Period”



Item (per slot)	AFC Groups			P-value
	Low (n = 391)	Medium (n = 376)	High (n = 377)	
Rearing (days)	276 ± 5.7 <sup>a</sup>	301 ± 5.7 <sup>b</sup>	352 ± 5.7 <sup>c</sup>	< 0.01
Repro cost, \$	39.9 ± 0.9 <sup>a</sup>	57.0 ± 0.9 <sup>b</sup>	94.6 ± 0.9 <sup>c</sup>	< 0.01
Feed cost, \$	533 ± 13 <sup>a</sup>	587 ± 13 <sup>b</sup>	705 ± 13 <sup>c</sup>	< 0.01
TOTAL RP cost, \$	807 ± 22 <sup>a</sup>	900 ± 22 <sup>b</sup>	1,099 ± 22 <sup>c</sup>	< 0.01

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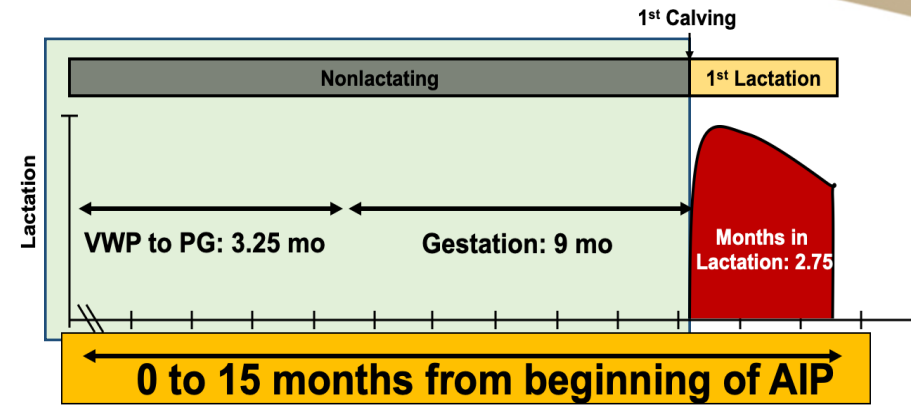
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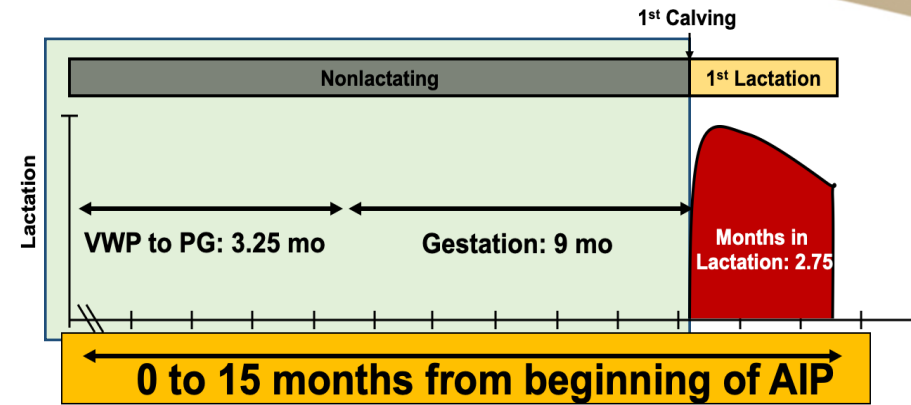
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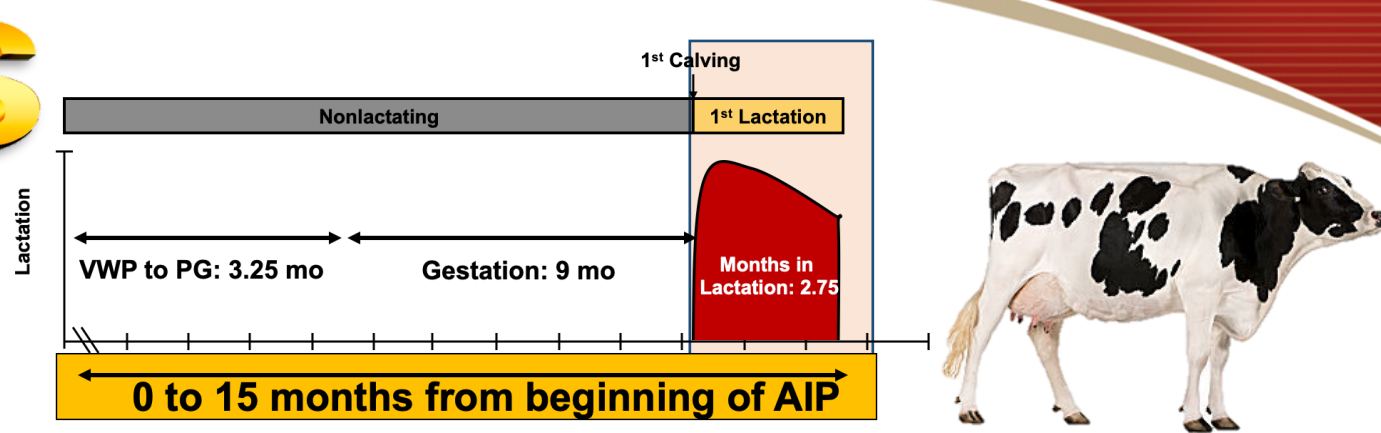
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		<b>+\$93</b>	<b>+\$292</b>	

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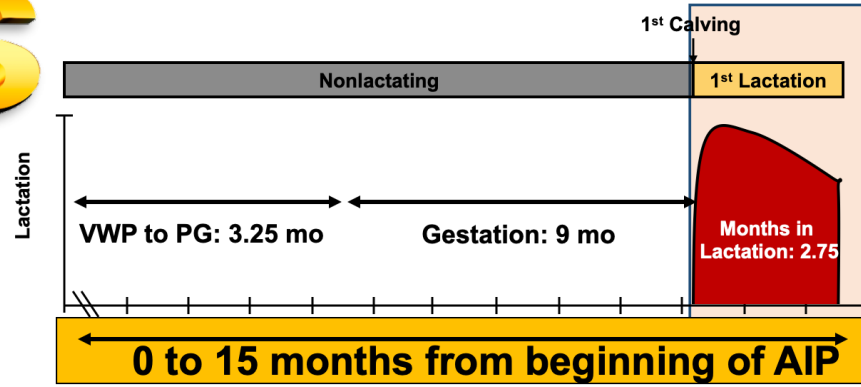
## “First Lactation Period”



Item (per slot)	AFC Groups			P-value
	Low (n = 391)	Medium (n = 376)	High (n = 377)	
First lactation (days)	180 ± 5.7 <sup>a</sup>	155 ± 5.7 <sup>b</sup>	104 ± 5.7 <sup>c</sup>	< 0.01
Calf value, \$	97.8 ± 1.8 <sup>a</sup>	96.7.0 ± 1.8 <sup>ab</sup>	92.5 ± 1.8 <sup>c</sup>	0.05
IOFC, \$	980 ± 58 <sup>a</sup>	850 ± 58 <sup>b</sup>	583 ± 58 <sup>c</sup>	< 0.01
TOTAL FLP profit, \$	454 ± 45 <sup>a</sup>	408 ± 45 <sup>a</sup>	304 ± 45 <sup>b</sup>	< 0.01

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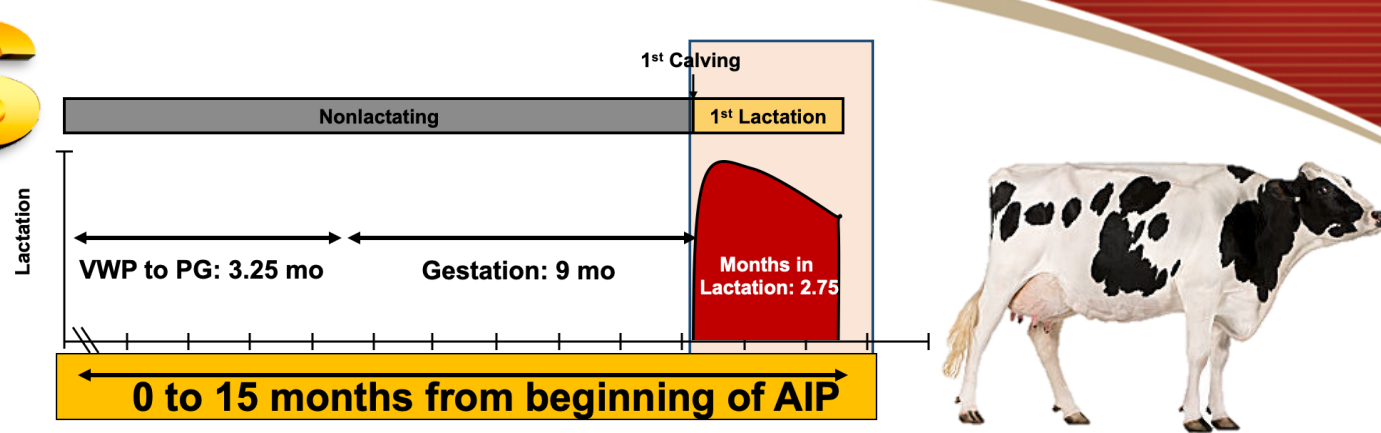
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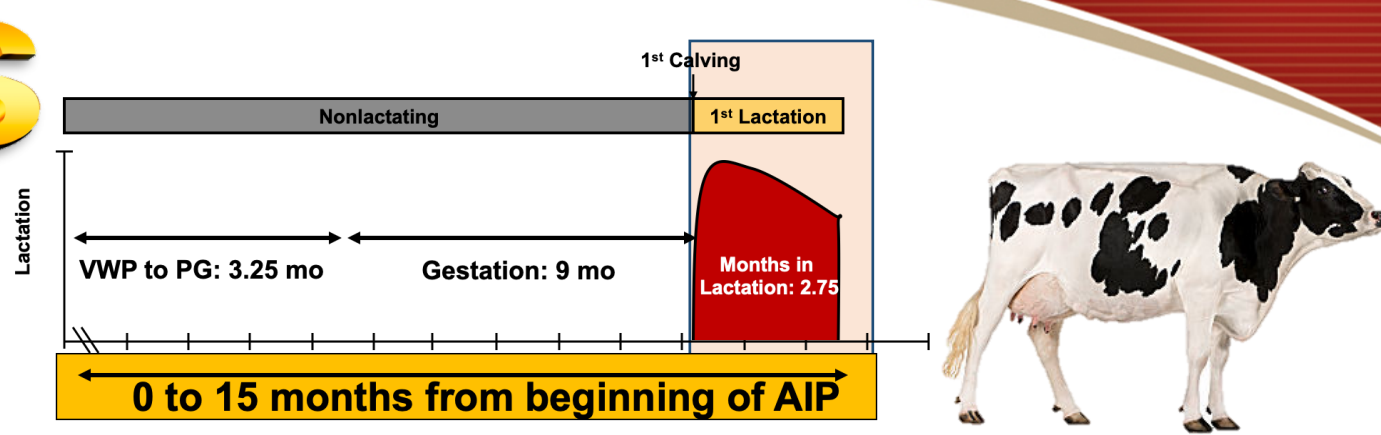
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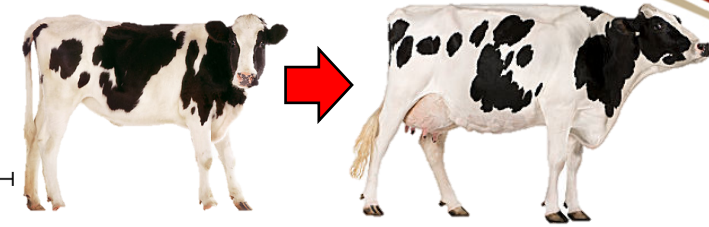
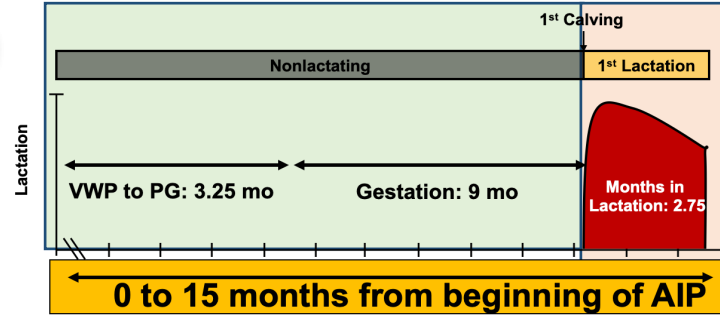
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			<b>-\$46</b>	<b>-\$150</b>

# Economics \$

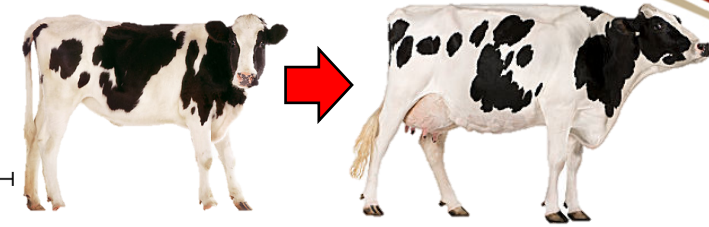
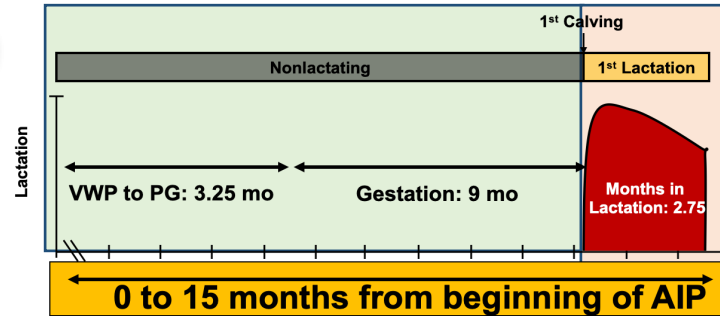
## “15-mo period”



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Cash Flow 15-mo, \$	-354 ± 63 <sup>a</sup>	-492 ± 63 <sup>b</sup>	-795 ± 63 <sup>c</sup>	< 0.01

# Economics \$

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		<b>-\$138</b>	<b>-\$441</b>	

# Conclusion \$

The profitability of replacement heifers during a 15-mo period after the beginning of the AIP increases as AFC decreases

# Acknowledgements



**Giordano Lab**



**Commercial dairy farms**



**Dr. Jim Ehrlich**



NY *farm viability*

AOR 15-020

INSTITUTE

