


Reproductive Management – Opportunities & Economic Decision Making

Julio Giordano, DVM, MS, PhD
 Assistant Professor
 Dairy Cattle Biology and Management
 Department of Animal Science
 Cornell University




A Few Relevant Questions...

- Value of improving 21d-Pregnancy Rate under current economic conditions?
- Incorporating the use of technology – Activity Monitors
- Reducing the interbreeding interval by early non-pregnancy diagnosis



Wisconsin-Cornell Dairy Repro\$


Reproductive Programs Economic Value



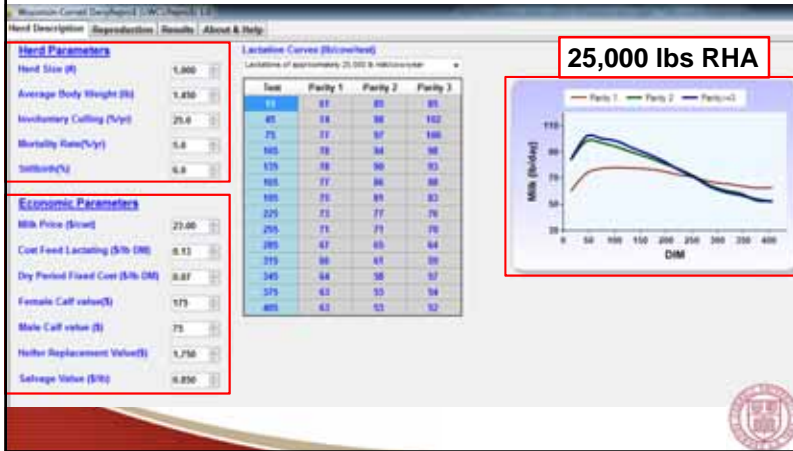
On the web at:
<http://www.ansci.cornell.edu/dm/index.html>
 & <http://dairymgt.info/tools.php#1>

A Few Common Questions...

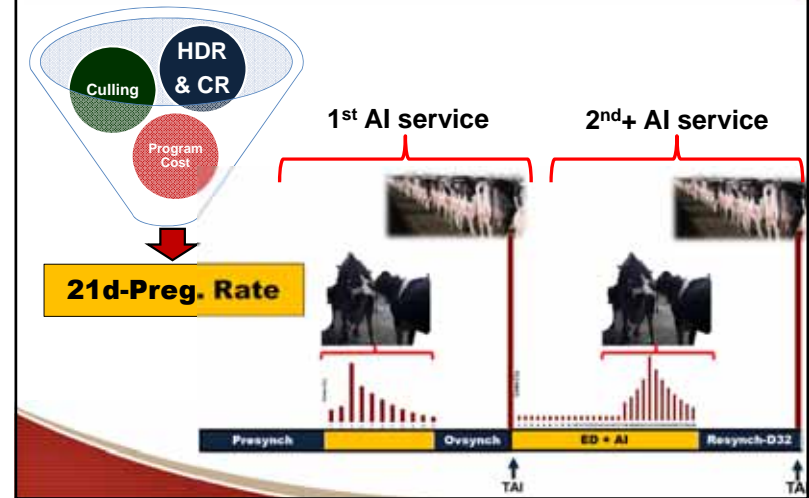
- Are there differences on the value of improving 21d-PR when baseline value is low versus high?
- Does it pay to go over 24-25% 21d-PR?



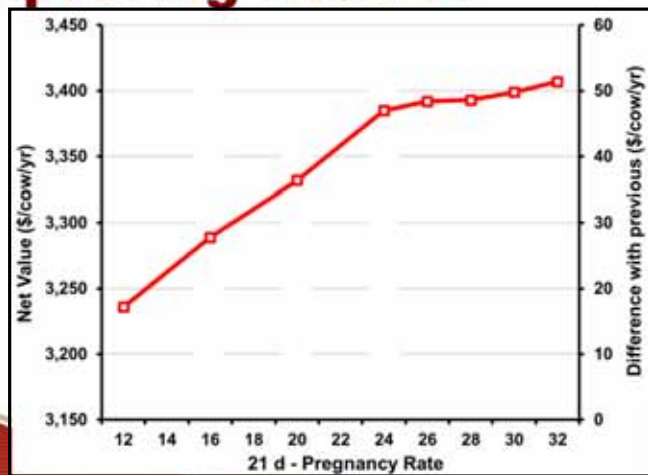
Modeled Scenario



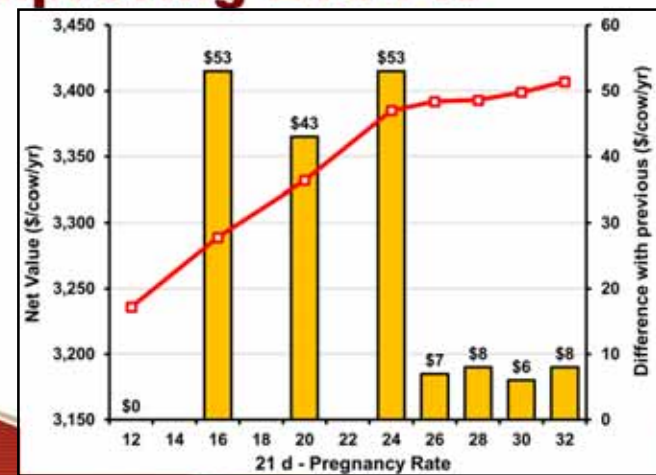
Modeled Scenario



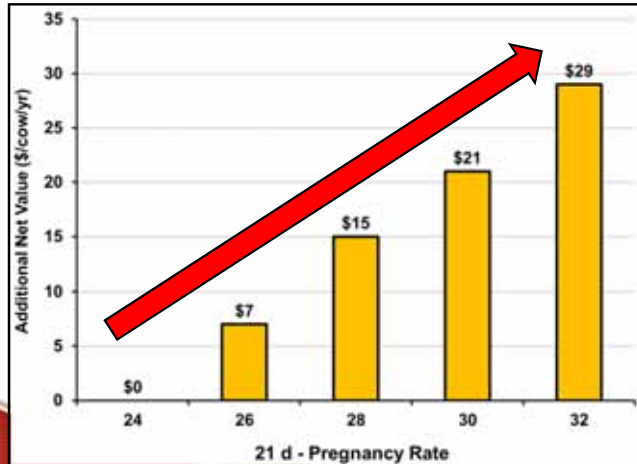
Economics of Improving 21d-PR



Economics of Improving 21d-PR



Economics of Improving 21d-PR



Value of Improving the 21d-PR – Take Home

Even though some general trends are consistent, the relationship between 21d-PR improvement and \$\$\$ is **COMPLEX**

Depends on:

- Farm type and conditions
- Repro program used
- Culling policy – better repro = “**profitability driven culling**”
- Labor and economic effort to increase PR

A Few Relevant Questions...

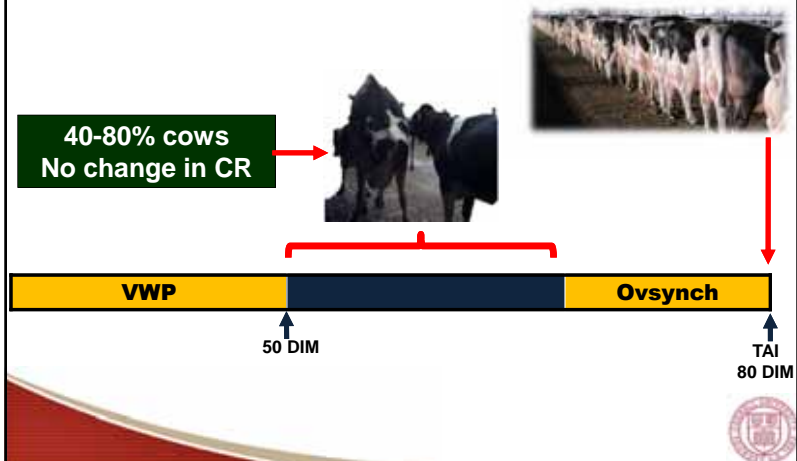
Value of improving **21d-Pregnancy Rate** under current economic conditions?

Incorporating the use of technology – **Activity Monitors**

Reducing the interbreeding interval by **early non-pregnancy diagnosis**

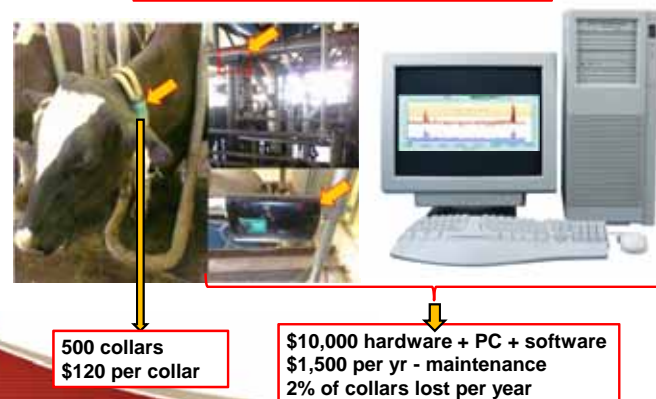


On-farm Scenario



AM System – Parameters

Life expectancy 3.5 vs. 7 years
Salvage value 10%



Visual Estrus Detection Parameters

Items

- 1,000 cows
- 1 person,
- 2 h/day or 3h/day,
- \$12.5/h



Cost per year for the herd

- 2h/d → \$9,125/yr
- 3h/d → \$13,688/yr

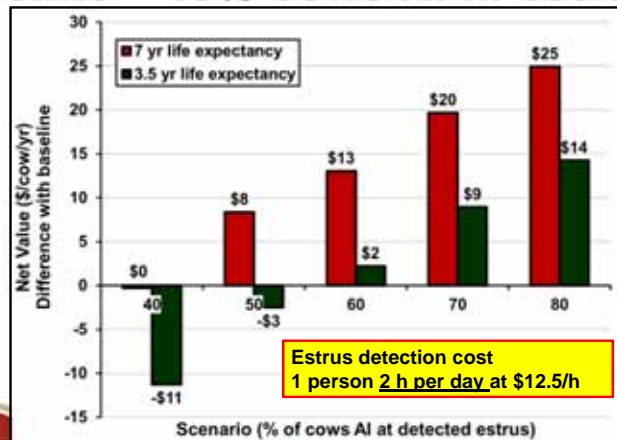
Value of Adopting an Activity Monitoring System

Scenarios evaluated:

- What is the economic value of improving estrus detection (ED) with an AM system when ED is low or high?
- What is the relationship between visual ED cost and AM system economic value?
- What is the impact of AM system lifespan on its economic value? what if the lifespan is 3.5 vs. 7 year?

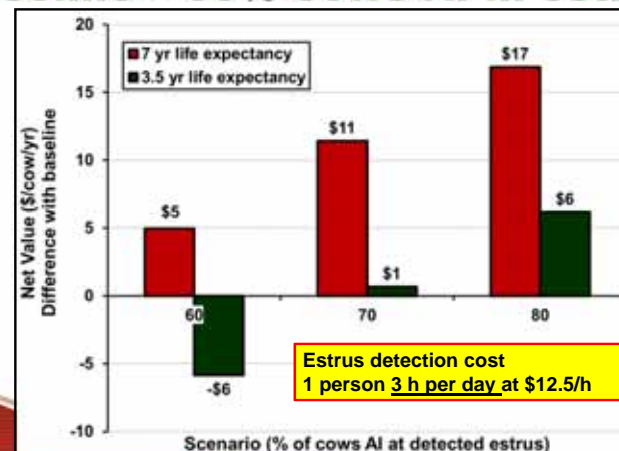
Value of Increasing ED Efficiency with AM

Baseline – 40% cows AI in estrus



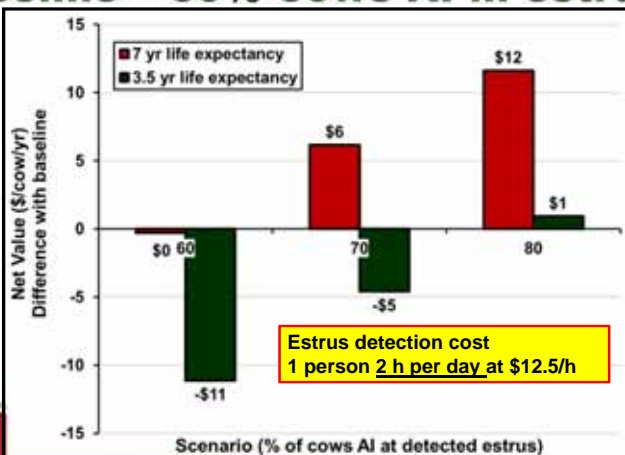
Value of Increasing ED Efficiency with AM

Baseline – 60% cows AI in estrus



Value of Increasing ED Efficiency with AM

Baseline – 60% cows AI in estrus



Economic Value of Adopting an Activity Monitoring System

- \$ value of replacing visual ED by an electronic AM system is highly dependent on the increase in % of cows AI after a detected estrus and more importantly the lifespan of the system
- Implementing an electronic AM system may not be economically beneficial when ED efficiency is high and visual ED cost is low
- Even though the impact of cost of ED (visual vs. AM) was taken into account, the opportunity cost to personnel when using AM (i.e., go do something else factor!) was not accounted for

A Few Relevant Questions...

Value of improving **21d-Pregnancy Rate** under current economic conditions?

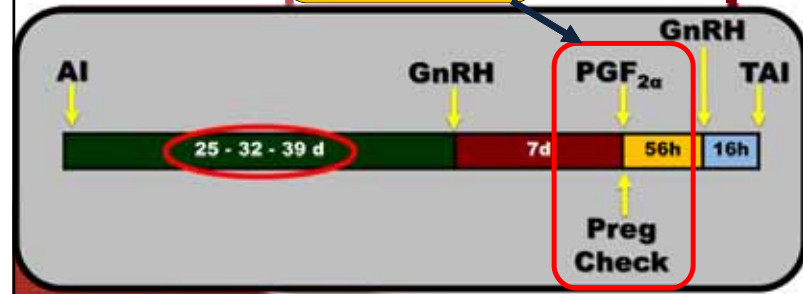
Incorporating the use of technology – **Activity Monitors**

Reducing the interbreeding interval by **early non-pregnancy diagnosis**



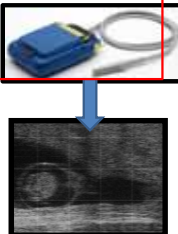
2+ AI Services

Limiting Step

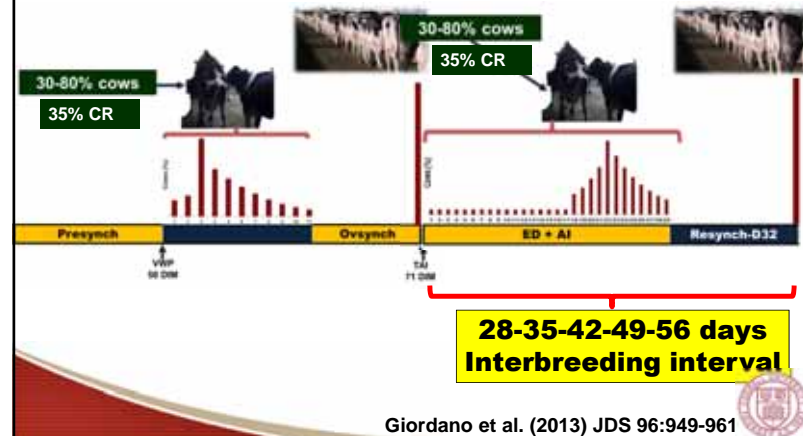


Identification of Non-Pregnant Cows

1. Rectal Palpation
2. Transrectal Ultrasound
3. Blood test

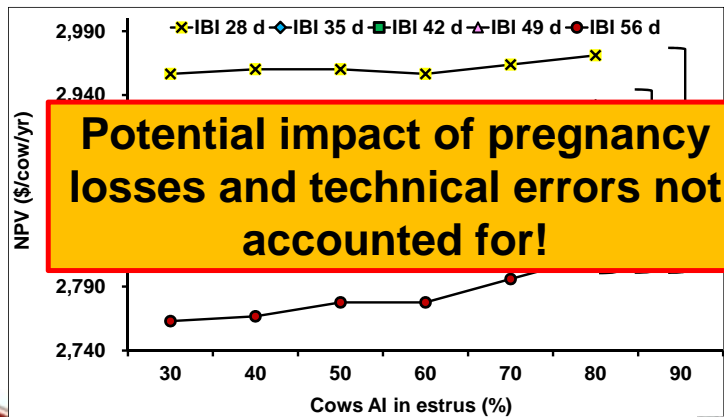


Simulation Experiment 1



Giordano et al. (2013) JDS 96:949-961

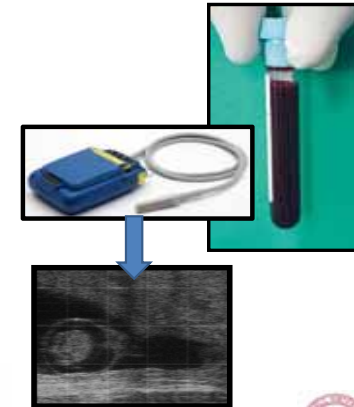
\$\$\$ Value of Shorter IBI



Giordano et al. (2013) JDS 96:949-961

Potential Tradeoffs of Early Non-Pregnancy Tests

- Affected by early pregnancy loss
- Lower sensitivity
- Lower specificity
- More questionable diagnoses
- Additional cost?



Potential Tradeoffs of Early Non-Pregnancy Tests

Lower Se = false (-)	Lower Sp = false (+)	Preg. Loss & Quest. Diag. = false (+)
<ul style="list-style-type: none"> • iatrogenic pregnancy loss 	<ul style="list-style-type: none"> • delayed rebreeding 	<ul style="list-style-type: none"> • delayed rebreeding

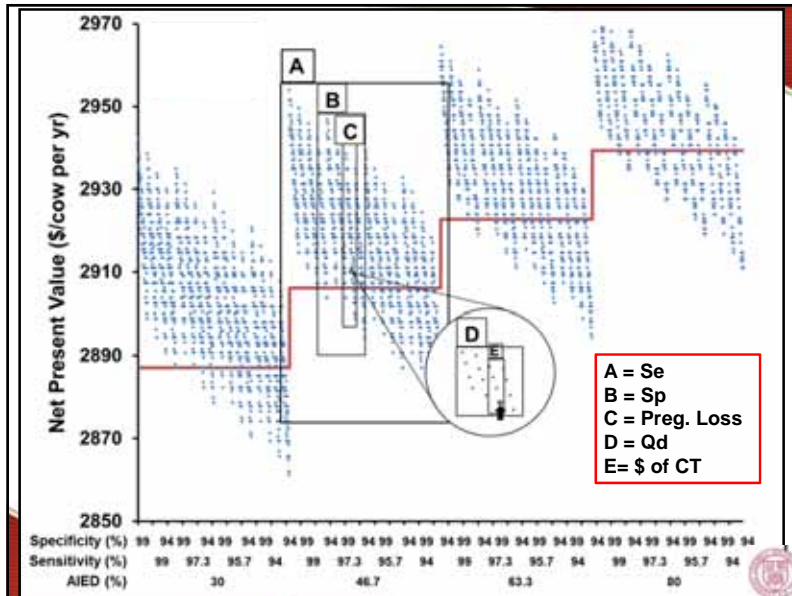


Earlier Test Parameters

	Possible today!		
	32 vs. 39 d test		
	Base	Min	Max
Sensitivity (%)	98	94	99
Specificity (%)	98	94	99
Pregnancy loss (%)	5.25	0	10
Quest. diagnosis (%)	3.3	0	10
Heat detection rate (%)	50	30	80
Cost test (\$/test)	2.4	0.5	5.0

Giordano et al. (2013) JDS 96:949-961





Discussion

Economic Value

- ☑ Value of a ET could be (+) or (-) depending largely on test parameters and preg. loss
- ☒ For baseline parameters the value of ET range from \$11 to \$13 greater than the value of later tests

Sensitivity

- ☑ ↑Se → ↑Value
- ☑ Most important factor
- ☒ 1.8 X more important than Sp
- ☒ To be at least 94%

Pregnancy loss

- ☑ ↑Pregnancy loss → ↓Value
- ☒ Same value as Sp

Cost of test

- ☑ ↑Cost CT: ↓ Value
- ☑ Least impact of all factors

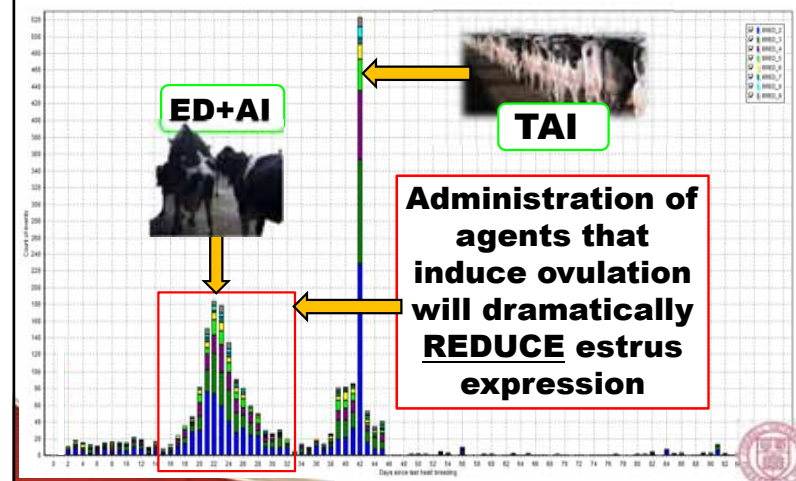
Giordano et al. (2013) JDS 96:949-961

Summary

- Value of early test compared to later test **tended to be positive**, but negative values were also observed
- More important than the nonpregnancy test per se, is the **integration of the test with an aggressive reproductive protocol**

Giordano et al. (2013) JDS 96:949-961

Resynchronization



Thank you!



Cornell University
Department of Animal Science

Julio Giordano
jog25@cornell.edu