Economics of Sexed Semen

1 Victor E. Cabrera, **Ferarroni Dairy School**, 4 Nov 09

Reproductive Variables

- CR for Holstein heifers: 34 to 83% (Avg. 56%) (DeJarnette et al., 2009)
- Sexed semen performance: 80% of conventional semen (Avg. 44.8%) (DeJarnette et al., 2009)
- CR decreases 2.5% for each additional service after first service (Kuhn et al., 2006)
- Conventional semen heifer calf rate: 46.7% (Silva del Rio et al., 2007)
- Sexed semen heifer calf rate: 89% (DeJarnette et al., 2009)

Economic Variables

- **Premium paid for sex-sorted semen dose: $30 (Olynk and Wolf, 2007)**
- **Heifer calf value: $562 (Wisconsin USDA Market Report, 2008)**
- **Bull calf value: $48 (Wisconsin USDA Market Report, 2008)**
- **Dystocia cost: $28.53 (Dematawewa and Berger, 1997).**
- **Bull Dystocia cost: 1.57 times greater than female (Martinez et al., 1983)**

Other Economic Variables

	Conventional and Sexed-Semen	Source
Heifer maintenance 15 to 20 mo old	$2.4/day	Zwald et al., 2007
Weight of a 20-mo non-pregnant heifer	505 kg	NRC, 2001
Salvage value of 20-mo non-pregnant heifer	$1.79/kg	Wisc. USDA (2008)
Value of 20-mo pregnant heifer	$1,200	Wisc. USDA (2008)
Interest rate	12%/year	

Baseline Scenario

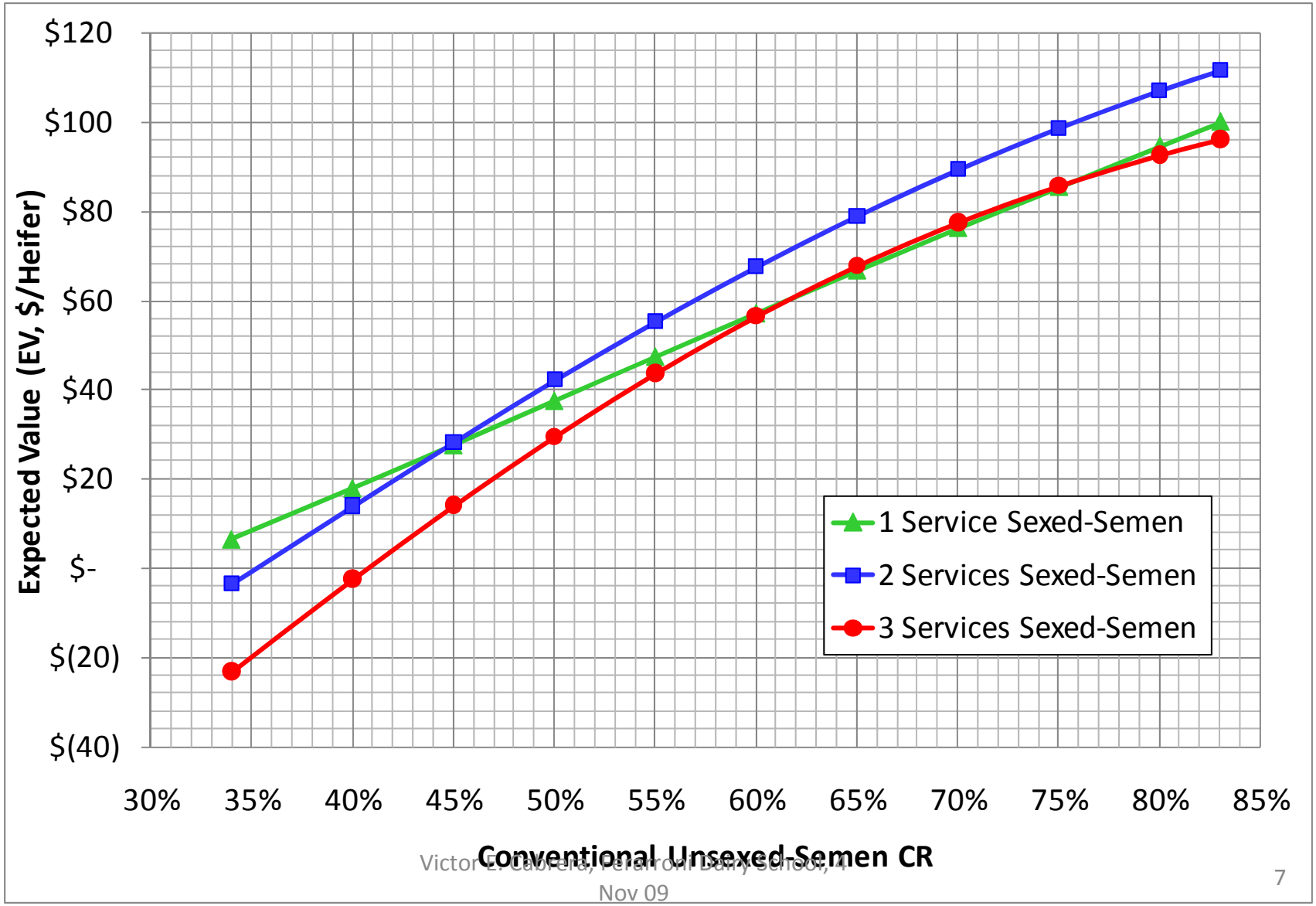
- **Sexed semen is always be justified for the first service for any level of CR (Overall EV = $30.10/heifer)**

Reproductive Program	Low Conventional CR (34 %)	Average Conventional CR (56 %)	High Conventional CR (83 %)	Required Conventional CR to Justify the Number of Sexed Semen Service(s) %
	EV $/heifer			
1 service with sexed semen	6.5 (Max)	49.3	100.0	31
2 first services with sexed semen	-3.4	57.8 (Max)	111.6 (Max)	36
3 first services with sexed semen	-23.1	46.4	96.1	41
4 first services with sexed semen	-48.9	24.7	71.7	48
All 5 services with sexed semen	-78.5	-2.7	43.9	58

Optimal Treatment

Scenario	Number of Services with Positive and Maximum Expected Value (EV)		
	Low Conventional CR (34 %)	Average Conventional CR (56 %)	High Conventional CR (83 %)
Baseline	1	2	2
1) Sexed Semen CR at 85 % of conventional CR	1	2	2
2) Sexed Semen CR at 75 % of conventional CR	None	2	2
3) Sexed Semen to have 95 % heifer Calves	1	2	2
4) Sexed Semen to have 78 % heifer Calves	None	1	1
5) Male calf value at $0	1	2	2
6) Female calf value at $700	1	2	2
7) Female calf value at $280	None	None	1
8) Dystocia cost at $42.8	1	2	2
9) Dystocia cost at $14.27	1	2	2
10) Premium paid for sexed-semen at $40	None	1	2
11) Premium paid for sexed-semen at $20	1	2	2
1) and 3)	2	2	2
3) and 6)	2	2	2
1) and 6)	2	2	2
1) and 3) and 6)	2	3	2
1) and 3) and 6) and 11)	3	3	2
2) and 4)	None	1	1
4) and 7)	None	None	1
2) and 4) and 7)	None	None	None

Optimal Treatment by CR



Impact of Other Variables

Variable	Impact
Heifer maintenance cost ($2.4/d baseline)	-$1.00 for every +$0.1
Salvage value ($1.79/kg baseline)	-$1.00 for every +$0.1
Pregnant heifer value ($1,200/heifer baseline)	-$2.84 for every +$100
Dystocia cost ($28.53/heifer baseline)	+$1.44 for every +$10
Premium of sex-sorted semen ($30 baseline)	-$14.50 for every +$5
Discount rate (12% baseline)	-$0.1 for every +10%

Decision Support Challenge

- Decision support system should be:
  - Visually attractive
  - Interactive
  - Robust
  - Preferably online
  - Self-contained
  - Scenario-driven
- Decision support system should have:
  - Secured calculations. Users characterize their situation by defining parameters
  - Clear instructions
  - Technical support available

Decision Support Challenge

Economic Value of Sexed Semen Programs for Dairy Heifers

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1. Conception Rates (CR)

1.a. Conventional Semen CR (%)

Low CR	36
Average CR	56
High CR	83

1.b. Sexed Semen CR (% of Conventional CR)

75

Instructions

Manage Scenarios

Print

DairyMGT Webpage

2. Expected Females (%)

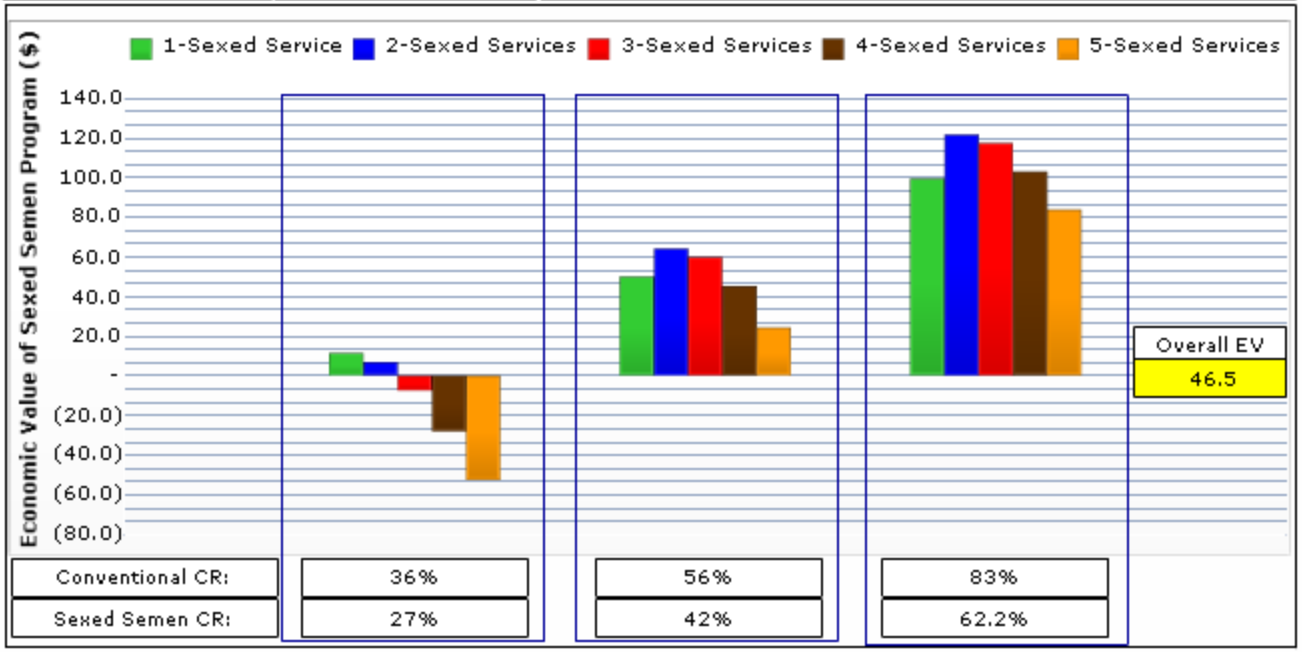
Conventiona	46.7
Sexec	89.8

3. Semen Cost ($)

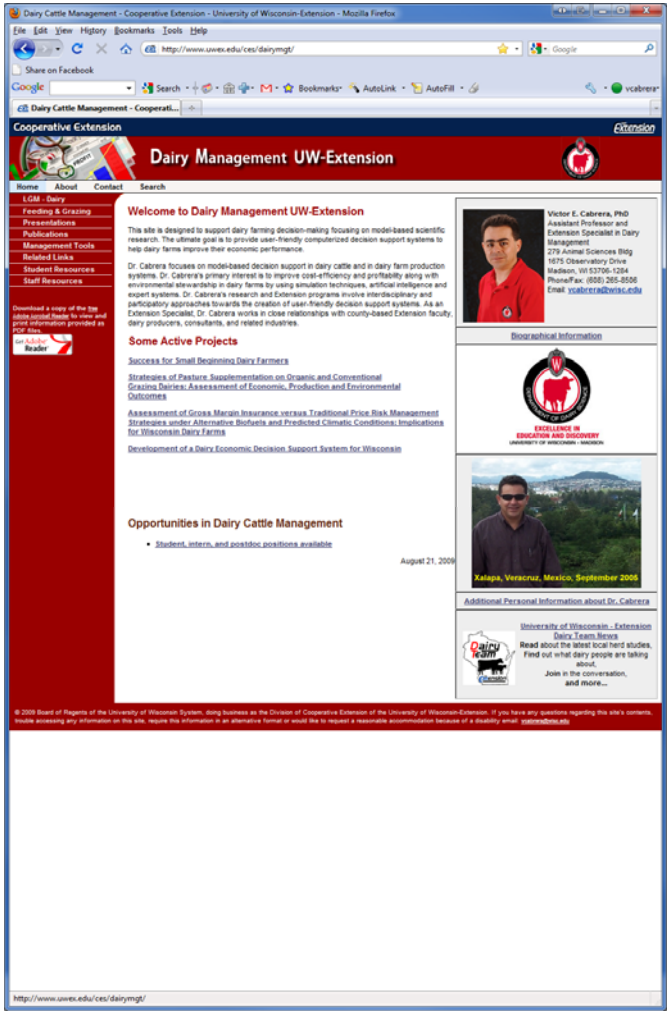
Conventiona	15
Sexec	35

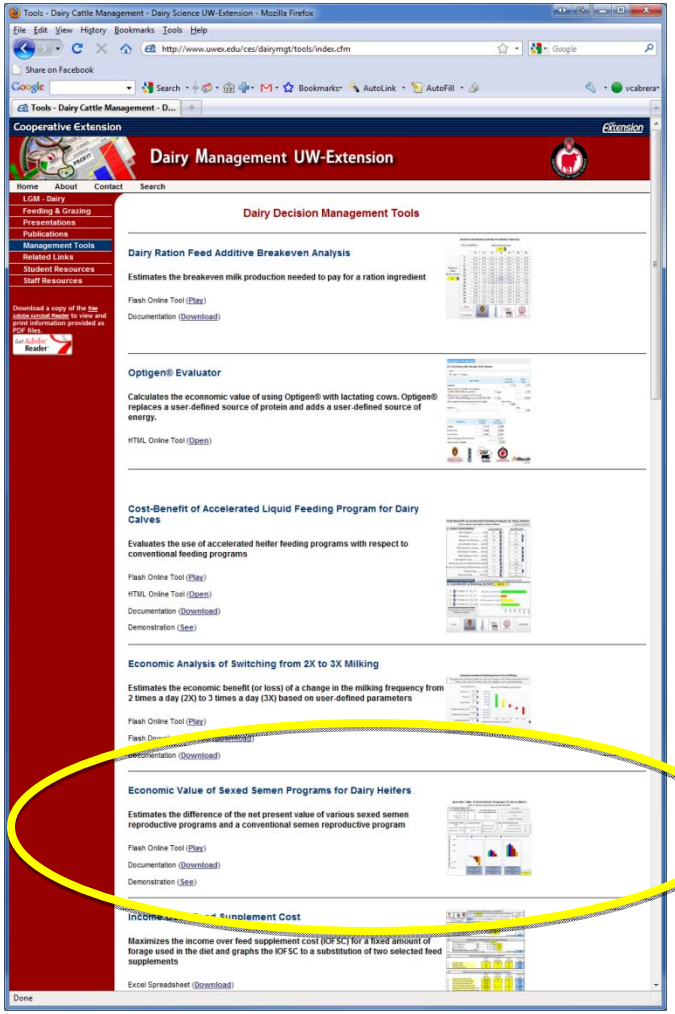
4. Other Economic Parameters

Discount (%/yr)	12	Raising Cost ($/c	2.4
Female Calf ($	562	Salvage Value ($/kg	1.79
Male Calf ($	48	Dystocia Cost ($/heifer	28.53
		20-mo Pregnant Heifer ($	1200



Thanks





http://www.uwex.edu/ces/dairymgt/