Components of a Successful Reproductive Management Program
Reproductive Management Program

Management
- Personnel
- SOP – Policy
- Cow Comfort - Facilities
- Records – Monitoring - PR

Herd Health
- Vaccination
- Mastitis
- Treat - Cull problem cows
- Diagnose pregnancies

Cow Fertility
- Transition
- Nutrition – DMI -NEB
- Increase % cycling

Artificial Insemination
- Timed AI versus Detected estrus
- AI technique – Semen handling
- Good quality semen
- Timing of insemination
Management

Personnel
SOP – Policy
Cow Comfort - Facilities
Records – Monitoring – PR
Motivated
Enjoys Cows
Personnel
Knowledgeable
Team player
ABC’s of Cow Comfort

- Air
- Bunk
- Comfort – Stalls
• Ventilation is the exchange of stale air with fresh air, removing moisture and ammonia.

• Air Movement is for cooling.
C is COMFORT
Water, Water, Water, and More Water!

Cows will drink 95-114 liters/day. Amounts can increase 50% or more in times of heat stress.
Benchmarks – Reproduction

Survival Curve Analysis

Performance Evaluation
What is the optimum calving interval?

![Graph showing the relationship between calving interval and milk production. The x-axis represents calving intervals in months, and the y-axis represents milk production in kilograms. The graph includes data for different intervals: less than 13 months, 13-13.9 months, 14-14.9 months, 15-15.9 months, 16-16.9 months, and greater than 16.9 months. The graph indicates that milk production increases with longer calving intervals.]

- **Daily milk**
- **Days 1st service**
- **% Heats Obs.**
- **Conception 1st service**
Most Important Factor Affecting Reproductive Efficiency

Percent serviced in first 24 days after start of breeding season or voluntary waiting period

Ideally 100 percent
Input

Days Open 161
Milk Price 15.00 $/cwt
Feed Cost 0.12 $/lb DM 0.26 $/kg DM
Heifer Cost 1800 $/head
Cull Price 0.36 $/lb 0.79 $/kg
Milk Yield 64.2 lb/cow/day 29.13 kg/cow/day
Cull Yield 30.0 lb/cow/day 13.61 kg/cow/day
Reproductive Losses 3.40 $/cow/d

Other Info

Milk Fat 3.60 %
Feed Cost 5.24 $/cwt

<table>
<thead>
<tr>
<th>Days Open</th>
<th>100</th>
<th>115</th>
<th>130</th>
<th>145</th>
<th>160</th>
<th>175</th>
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<tbody>
<tr>
<td>$/cow/d</td>
<td>0.38</td>
<td>0.77</td>
<td>1.37</td>
<td>2.21</td>
<td>3.32</td>
<td>4.74</td>
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</table>

Days Open Cost

$/cow/d vs 85 DO

Days Open

$/cow/d
GOALS
## Goals for Reproductive Performance

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Goal</th>
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<tbody>
<tr>
<td>Days Open</td>
<td>130</td>
</tr>
<tr>
<td>Days to 1(^{st}) Service</td>
<td>75</td>
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<tr>
<td>Pregnancy Rate, (%)</td>
<td>&gt;20</td>
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<tr>
<td>Conception Rate, 1(^{st}) Service, (%)</td>
<td>45</td>
</tr>
<tr>
<td>Heat Detection Rate, (%)</td>
<td>&gt;60</td>
</tr>
<tr>
<td>Age at First Calving,(mo)</td>
<td>24</td>
</tr>
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</table>
Pregnancy Rate
Pregnancy Rate

“Percentage of Eligible Cows Becoming Pregnant in a 21-Day Period”

(Time component!)

= Conception Rate X Heat Detection Rate

“Service Rate”
### 9-Month Pregnancy Rate Summary by Date (Ex Cull)

**PCDART Report**

<table>
<thead>
<tr>
<th>Last Date of 21 days</th>
<th>-------- #Eligible --------</th>
<th>#Reported</th>
<th>Rate</th>
<th>-------- #Eligible --------</th>
<th>#Reported</th>
<th>Rate</th>
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<td>11-25-2000</td>
<td>160</td>
<td>88</td>
<td>55</td>
<td>158</td>
<td>29</td>
<td>18</td>
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<td>12-16-2000</td>
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<td>83</td>
<td>50</td>
<td>163</td>
<td>30</td>
<td>18</td>
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<td>01-06-2001</td>
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<td>70</td>
<td>46</td>
<td>149</td>
<td>26</td>
<td>17</td>
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<td>01-27-2001</td>
<td>136</td>
<td>56</td>
<td>41</td>
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<td>23</td>
<td>17</td>
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<td>02-17-2001</td>
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<td>51</td>
<td>131</td>
<td>22</td>
<td>17</td>
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<td>03-10-2001</td>
<td>139</td>
<td>63</td>
<td>45</td>
<td>138</td>
<td>22</td>
<td>16</td>
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<tr>
<td>03-31-2001</td>
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<td>91</td>
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<td>136</td>
<td>27</td>
<td>20</td>
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<tr>
<td>04-21-2001</td>
<td>124</td>
<td>63</td>
<td>51</td>
<td>122</td>
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<td>18</td>
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<td>05-12-2001</td>
<td>109</td>
<td>55</td>
<td>50</td>
<td>109</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>06-02-2001</td>
<td>110</td>
<td>66</td>
<td>60</td>
<td>110</td>
<td>12</td>
<td>11</td>
</tr>
<tr>
<td>06-23-2001</td>
<td>119</td>
<td>73</td>
<td>61</td>
<td>47</td>
<td>19</td>
<td>40</td>
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<tr>
<td>07-14-2001</td>
<td>112</td>
<td>55</td>
<td>49</td>
<td>31</td>
<td>2</td>
<td>6</td>
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<tr>
<td>08-04-2001</td>
<td>125</td>
<td>59</td>
<td>47</td>
<td>35</td>
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<tr>
<td><strong>total</strong></td>
<td><strong>1723</strong></td>
<td><strong>889</strong></td>
<td><strong>52</strong></td>
<td><strong>1465</strong></td>
<td><strong>249</strong></td>
<td><strong>17</strong></td>
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</table>
Cow Fertility

Transition

Nutrition – DMI – NEB

Increase % cycling
The text is a diagram describing the "100 Day Contract" transition program for dairy cows. The program is divided into three phases:

- **Dry Cow Program**
  - Dry Off: -14 to -21
  - Calving: 0
  - Transition Phase: 28

- **Fresh Cow Program**

- **Breeding Program**
  - End of Voluntary Waiting Period: 45
  - 1st AI With Synchronization program: 60
  - 75

The diagram illustrates the timeline and key events in the transition process.
Milk Fever Increases Incidence of Other Fresh Cow Diseases

- Ketosis - 8.9 X
- Coliform Mastitis - 8.1 X
- Dystocia - 6.5 X
- Displaced Abomasum - 3.4 X (4.8 X w/ sub-clinical)
- Retained Placenta - 3.2 X
Body Condition Score

Energy Balance – Ovarian Status
Relationship Between DMI and First Postpartum Ovulation

Staples et al., 1990
Relationship Between Milk and First Ovulation

Staples et al., 1990
## Effects of BCS Loss Upon Breeding

<table>
<thead>
<tr>
<th></th>
<th>&lt;1/2 BCS Loss</th>
<th>½ - 1 BCS Loss</th>
<th>&gt;1 BCS Loss</th>
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</thead>
<tbody>
<tr>
<td>Days to 1&lt;sup&gt;st&lt;/sup&gt; Ovulation</td>
<td>27</td>
<td>31</td>
<td>42</td>
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<tr>
<td>Days to 1&lt;sup&gt;st&lt;/sup&gt; Estrus</td>
<td>48</td>
<td>41</td>
<td>62</td>
</tr>
<tr>
<td>Days to 1&lt;sup&gt;st&lt;/sup&gt; Service</td>
<td>68</td>
<td>67</td>
<td>79</td>
</tr>
<tr>
<td>1st Service Conception Rate</td>
<td>65</td>
<td>53</td>
<td>17</td>
</tr>
</tbody>
</table>

Butler and Smith, 1989
Artificial Insemination

Timed AI
versus
Detected estrus

AI technique
Semen handling
Good quality semen
Timing of insemination
High detection rates require:

- Good nutrition and feeding program
- Excellent cow comfort
- Best hoof health possible
- Consistency by all involved
- Attention to details
Distribution of Standing Events During Estrus for Holstein Cows at the Virginia Tech Dairy Cattle Center

![Bar Chart]

- **Number of Standing Events**
  - < 3
  - 4 to 7
  - 8 to 14
  - > 14

- **Frequency**
  - 0
  - 10
  - 20
  - 30
  - 40
  - 50
  - 60

The chart shows the distribution of standing events during estrus for Holstein cows at the Virginia Tech Dairy Cattle Center.
Distribution of estrus duration for Holstein cows at the Virginia Tech Dairy Cattle Center
Distribution of Onset of Estrus

- 6:01 pm to 12:00 am (27%)
- 12:01 pm to 6:00 pm (20%)
- 6:01 am to 12:00 pm (28%)
- 12:01 am to 6:00 am (25%)

n = (2661)

Dransfield et al., 1998
Average Holstein Cow

7 “standing events”
7 hours - 1st to last stand
Onset occurs equally 24-7
Successful Heat Detection Program

Observation Periods
- Three times daily – Four preferred
- Location – good footing
- Write down heats and signs observed
- Walk threw to identify 2nd signs then maintain distance not to distract cows

Cow Factors
- Hoof health
- Group interactions

Detection Aids
- Chalk/paint
- Kamar, Beacon, & EstrusAlert devices

Standard Operating Procedures

Hormone TX
- PGF2α
- OvSynch
- CIDR

Records
- Heat Expectancy Chart

Systems
- Tailstriping
- Pedometers
- HeatWatch
Improving Pregnancy Rate

Timed AI Programs that Eliminate Heat Detection (1st Service)

- Ovsynch
- Pre-Synch
- HeatSynch
- CIDR
Survival curve for a 14% PR compared to TAI for 1st service (33% PR) and a 14% PR following TAI.
### Presynch/Ovsynch

<table>
<thead>
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<th>Parameter</th>
<th>Value</th>
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<tbody>
<tr>
<td>Total Cows</td>
<td>200</td>
</tr>
<tr>
<td>CR, % 1st synchronization</td>
<td>40.0</td>
</tr>
<tr>
<td>CR, % 2nd+ synchronization</td>
<td>35.0</td>
</tr>
<tr>
<td>Resynch, # of times</td>
<td>3</td>
</tr>
<tr>
<td>Milk P4 or Ultrasound, Y/N</td>
<td>n</td>
</tr>
<tr>
<td>Set-up PGF, Y/N</td>
<td>n</td>
</tr>
<tr>
<td>Milk P4/Palp, $/test or palp</td>
<td>1.00</td>
</tr>
<tr>
<td>PGF, $/shot</td>
<td>3.00</td>
</tr>
<tr>
<td>GnRH, $/shot</td>
<td>3.00</td>
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<tr>
<td>Labor, $/hour</td>
<td>10.00</td>
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<tr>
<td>Injection Labor, min/cow</td>
<td>1.00</td>
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<tr>
<td>Semen, $/straw</td>
<td>15.00</td>
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<tr>
<td>AI Labor, min/insemination</td>
<td>5.00</td>
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<tr>
<td>Total Cost, $</td>
<td>15749</td>
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<tr>
<td>Unadj Cost, $/Pregnancy</td>
<td>95.69</td>
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<td>Repro Culls, #</td>
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<td>Days Open</td>
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<td>Added DO</td>
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<td>Added DO Cost, $/DO</td>
<td>0.88</td>
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<td>Adj Cost, $/Pregnancy</td>
<td>95.69</td>
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### Visual Heat Detection

<table>
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<th>Parameter</th>
<th>Value</th>
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<tbody>
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<td>Total Cows</td>
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<tr>
<td>EWP, days</td>
<td>50</td>
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<tr>
<td>DNB, days</td>
<td>300</td>
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<tr>
<td>HDR, %</td>
<td>40.0</td>
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<tr>
<td>CR</td>
<td>36.0</td>
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<tr>
<td>PR</td>
<td>14.4</td>
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<tr>
<td>Labor, $/hour</td>
<td>10.00</td>
</tr>
<tr>
<td>HD Labor, min/day</td>
<td>60.00</td>
</tr>
<tr>
<td>Semen, $/straw</td>
<td>15.00</td>
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<tr>
<td>AI Labor, min/insemination</td>
<td>5.00</td>
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<tr>
<td>Total Cost, $</td>
<td>10708</td>
</tr>
<tr>
<td>Unadj Cost, $/Pregnancy</td>
<td>64.51</td>
</tr>
<tr>
<td>Repro Culls, #</td>
<td>34</td>
</tr>
<tr>
<td>Days Open</td>
<td>162</td>
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<tr>
<td>Added DO</td>
<td>41</td>
</tr>
<tr>
<td>Added DO Cost, $/DO</td>
<td>3.50</td>
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<tr>
<td>Adj Cost, $/Pregnancy</td>
<td>207.94</td>
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</table>
AI technique – Semen handling
Why do Cows Fail to Conceive?

- Fertilization failure
  - Sperm and egg never met
  - "Usually" male/AI technique related
- Embryonic mortality
  - Fertilization occurred but embryo died
  - "Usually" female related
Herd Health

Vaccination
Mastitis
Treat or Cull
Diagnose pregnancies
Implement an Effective Vaccination Program

- Proper use and care of vaccines
- Diseases affecting reproduction
  - Brucellosis
  - BVD
  - Neospora
  - Leptospirosis
  - IBR
Mastitis Affects Conception!!!
Herd Health Program & Biosecurity

Herd visits should not be:
Just for “preg checks”
Bull_____ sessions
Squeezed in between other “important” events
Delegated to whoever can’t find a place to hide
Look at everything that got sick since the last visit
Scheduled herd visits should be:

- Time to exam problem cows and pregnancy exams
- Review records
- Time to discuss problems and solutions
- Time to look at dry cows, young stock as well as lactating cows – BCS
- Opportunity to set discuss goals, trade info and work together.
Focus on Priorities

• Each dairy has strengths and weaknesses

• Establish control points to monitor the critical factors

• Establish a system and stick with it!
A calving interval $\leq 13.5$ months is an achievable goal that will produce higher daily milk yield and higher milk yield over the length of the lactation.

The goal of every dairy should be to have 100% of the cows inseminated within 24 days of the voluntary waiting period.
“Management” must set Standard Operating Procedures for all aspects of the program:

- Heat detection
- AI techniques
- Synchronization of heats or ovulation
- Repeat breeders
- Vaccination program

The SOPs established by “Management” should be followed by all involved!
Thank You