First Service Management and Impact of Different Voluntary Waiting Period Durations

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Repro Management

21d-Preg Rate

ED+AI

TAI

First service postpartum

Best Repro Program Varies by Farm Resources

Repro Management

21d-Preg Rate

ED+AI

TAI
Difficulties with AI Based on Estrus Detection

- 1-anestrus
- 2-ovulatory failure
- 3-anestrus and anovulation

Valenza et al., (2012)
Stevenson et al., (2014)

+++ Intensity   - - -

1st AI – Maximize EDAI

Presynch 12 vs. 14 with Detection of Estrus

Giordano et al., 2016 (JDS:99(1):746-57)
Take Home...
When using Presynch-Ovsynch in combination with detection of estrus there is NO need to reduce interval from Presynch to Ovsynch to less than 14 days.

**Effect of Treatment on Days to Pregnancy**

- **Act + Ovsynch (n = 339)**
  - 56% EDAI – P/Al = 30% & TAI P/Al = 35%
  - Presynch-Ovsynch + Act = 70% EDAI – P/Al = 30% & TAI P/Al = 35%
  - Presynch-Ovsynch 100% TAI = 70% with Activity & P/Al 42%

**AAM Integration into Reproductive Management**

- Programs that incorporate EDAI/AIACT are comparable to programs that rely more on TAI
- In all cases some level of hormonal intervention was implemented to ensure timely insemination
**TAI vs EDAI+TAI & Different VWP**

- **VWP = 50 DIM**
- **VWP = 60 DIM**
- **VWP = 88 DIM**

**Short VWP (n = 454)**
- DO60 vs DO88: 1.1 (1.0-1.3)
- PSOv vs DO88: 1.4 (1.2-1.6)

**Long VWP (n = 397)**
- DO60 vs DO88: 1.5 (1.3-1.8)

**Time to Pregnancy During Lactation**

- **Proportion not pregnant (%)**
- **Mean (d) to preg.**
  - DO60 (n = 436)
  - DO88 (n = 429)
  - PSOv (n = 437)

**Repro Management**

- 21d-Preg Rate
- **First service postpartum**

- **EDA+AI**
- **TAI**
Presynch-Ovsynch (Moreira et al., 2001)

Double-Ovsynch (Souza et al., 2008)

G6G (Bello et al., 2006)

First Service TAI

Pre-Ovsynch Breeding-Ovsynch

- Good program when farm prefers to use 100% TAI for 1st service
- Works very well for primiparous cows. Can improve P/AI by 5-20% compared with Presynch-Ovsynch and Ovsynch (Souza et al., 2008; Herlihy et al., 2012)
- May or may not be better for multiparous cows (0-4% improvement in P/AI)

Double-Ovsynch is an Effective Program for 1st TAI

Double-Ovsynch

<table>
<thead>
<tr>
<th>Sun</th>
<th>Mon</th>
<th>Tue</th>
<th>Wed</th>
<th>Thu</th>
<th>Fri</th>
<th>Sat</th>
</tr>
</thead>
<tbody>
<tr>
<td>7 h</td>
<td>3 h</td>
<td>7 h</td>
<td>7 h</td>
<td>56 h</td>
<td>16 h</td>
<td>16 h</td>
</tr>
</tbody>
</table>

Pre-Ovsynch Breeding-Ovsynch

Double-Ovsynch Impact on 1st Service

Breed Number

Lact >1
Additional PGF Treatment?

- Additional PGF treatment (12-24 h after initial PGF) increased luteal regression by ~10-15 percentage points (Brusveen et al., 2006; Wiltbank et al., 2015)
- Expected improvement in fertility of 3-5 percentage points (Brusveen et al., 2006; Wiltbank et al., 2015)
- Similar range of improvement in P/AI (~4 percentage points) with 50% greater dose (750 ug) of Cloprostenol (Giordano et al., 2013)

Reasons for a VWP in Dairy Cows

1. Maximize 1st service P/AI and overall reproductive performance
2. Control lactation length

VWP of 60 vs 88 DIM Experimental Design

- VWP60 (n = 1,272) 60 ± 3 d
- VWP88 (n = 1,154) 88 ± 3 d
- End VWP +28 d
- EDAI + TAI (D32-Resynch)
- Stangaferro et al., 2017 JDS (In press)

Extending VWP from 60 to 88 DIM Favored a Physiological Status More Conducive to Pregnancy

- Increased % cyclic before synch protocol
- Reduced PVD (clinical endometritis) and SCE (subclinical endometritis)
- Increased % with BCS ≥2.75 before TAI
  - Primi = 5 p.p.
Extending VWP from 60 to 88 DIM Increased 1st AI P/AI

P/AI at 1st service

<table>
<thead>
<tr>
<th>Group</th>
<th>VWP60</th>
<th>VWP88</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean (CI) d to Preg</td>
<td>136 (128-144)</td>
<td>157 (150-164)</td>
</tr>
<tr>
<td>Median (CI) d to Preg</td>
<td>102 (98-106)</td>
<td>128 (124-132)</td>
</tr>
<tr>
<td>% NP 350 DIM</td>
<td>8.1 (7.8-8.5)</td>
<td>9.8 (9.5-10.1)</td>
</tr>
</tbody>
</table>

HR (CI) for pregnancy LVWP 0.76 (0.70-0.83)  
P-value <0.01

Stangaferro et al., 2017 JDS (In press)

Pregnancy Delayed for VWP88

Herd Exit Dynamics May Depend on Parity and Milk Production Level

Multiparous cows in VWP88 group more likely to leave the herd, especially at later DIM

Lower producing cows more likely to leave the herd regardless of VWP duration

Stangaferro et al., 2017 JDS (In press)
Summary - Repro
Extending the VWP from 60 to 88 DIM resulted in:
- ↑ cyclic cows before synchronization, ↓ % of cows with uterine DZ before AI, and ↑ % of cows with BCS ≥ 2.75 before AI
- Greater P/AI to first service – greatest effect on primiparous cows
- Shifted timing of pregnancy towards later lactation
- Similar proportion of cows pregnant at the end of lactation – biased by herd exit dynamics

Economic Analysis
Cash flow ($/slot/18 mo) = IOFC + Repro Cost + rbST + Calf Value + Replacement Cost + Operating cost

Cash Flow per Slot Not Different for ALL Parities Combined

<table>
<thead>
<tr>
<th>Item</th>
<th>VWP60 (n = 1,271)</th>
<th>VWP88 (n = 1,265)</th>
<th>TRT</th>
<th>PAR</th>
<th>T*P</th>
</tr>
</thead>
<tbody>
<tr>
<td>IOFC</td>
<td>4,445</td>
<td>4,427</td>
<td>0.61</td>
<td>&lt;0.01</td>
<td>0.65</td>
</tr>
<tr>
<td>Repro Cost</td>
<td>69</td>
<td>64</td>
<td>0.01</td>
<td>0.18</td>
<td>0.27</td>
</tr>
<tr>
<td>Calf value</td>
<td>88</td>
<td>86</td>
<td>0.47</td>
<td>&lt;0.01</td>
<td>0.34</td>
</tr>
<tr>
<td>Replacement Cost</td>
<td>516</td>
<td>520</td>
<td>0.66</td>
<td>&lt;0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>% Left herd 540d</td>
<td>44.6</td>
<td>46.7</td>
<td>0.81</td>
<td>&lt;0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>Fixed Cost</td>
<td>1,350</td>
<td>1,350</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Profitability</td>
<td>2,598</td>
<td>2,578</td>
<td>0.93</td>
<td>&lt;0.01</td>
<td>0.15</td>
</tr>
<tr>
<td>Profit/Day CI</td>
<td>+$20 X Short VWP</td>
<td></td>
<td>0.93</td>
<td>&lt;0.01</td>
<td>0.15</td>
</tr>
</tbody>
</table>

Stangaferro et al., unpublished
### Cash Flow for 18 mo after Calving

#### PRIMIPAROUS

<table>
<thead>
<tr>
<th>Primiparous</th>
<th>VWP60</th>
<th>VWP88</th>
<th>Diff</th>
<th>P-val</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cows</td>
<td>480</td>
<td>471</td>
<td>- -</td>
<td>- -</td>
</tr>
<tr>
<td>Cash flow ($/slot)</td>
<td>1,756 ± 148</td>
<td>1,824 ± 148</td>
<td>68</td>
<td>0.32</td>
</tr>
<tr>
<td>Cash flow per day ($/slot/d)</td>
<td><strong>+$68 X Long VWP</strong></td>
<td>0.12</td>
<td>0.32</td>
<td></td>
</tr>
<tr>
<td>Milk income over feed cost</td>
<td>3,806 ± 119</td>
<td>3,803 ± 119</td>
<td>-3</td>
<td>0.95</td>
</tr>
<tr>
<td>Calf value</td>
<td>100.5 ± 3.5</td>
<td>102.9 ± 3.5</td>
<td>2.4</td>
<td>0.59</td>
</tr>
<tr>
<td>Replacement cost</td>
<td>327.3 ± 52.1</td>
<td>259.0 ± 52.3</td>
<td>-68.3</td>
<td>0.07</td>
</tr>
<tr>
<td>Reproductive cost</td>
<td>97.58 ± 1.38</td>
<td>91.28 ± 1.40</td>
<td>-6.3</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>bST cost</td>
<td>215.9 ± 23.6</td>
<td>221.6 ± 23.6</td>
<td>5.7</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Other operating expenses</td>
<td>1,512</td>
<td>1,512</td>
<td>- -</td>
<td>- -</td>
</tr>
</tbody>
</table>

#### MULTIPAROUS

<table>
<thead>
<tr>
<th>Primiparous</th>
<th>VWP60</th>
<th>VWP88</th>
<th>Diff</th>
<th>P-val</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cows</td>
<td>480</td>
<td>471</td>
<td>- -</td>
<td>- -</td>
</tr>
<tr>
<td>Cash flow ($/slot)</td>
<td>2,006 ± 124</td>
<td>1,921 ± 124</td>
<td>-85</td>
<td>0.19</td>
</tr>
<tr>
<td>Cash flow per day ($/slot/d)</td>
<td><strong>-$85 X Long VWP</strong></td>
<td>-0.15</td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td>Milk income over feed cost</td>
<td>4,363 ± 132</td>
<td>4,324 ± 132</td>
<td>-39</td>
<td>0.38</td>
</tr>
<tr>
<td>Calf value</td>
<td>80.78 ± 2.52</td>
<td>77.98 ± 2.52</td>
<td>-2.80</td>
<td>0.43</td>
</tr>
<tr>
<td>Replacement cost</td>
<td>624.9 ± 31.4</td>
<td>673.6 ± 31.3</td>
<td>48.7</td>
<td>0.16</td>
</tr>
<tr>
<td>Reproductive cost</td>
<td>104.14 ± 1.95</td>
<td>93.63 ± 1.95</td>
<td>-10.5</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>bST cost</td>
<td>219.4 ± 25.6</td>
<td>224.9 ± 25.6</td>
<td>5.5</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Other operating expenses</td>
<td>1,512</td>
<td>1,512</td>
<td>- -</td>
<td>- -</td>
</tr>
</tbody>
</table>

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**Stangaferro et al., unpublished**

### Effect of Varying Input Costs on Economic Differences

- **Primiparous**
  - Replacement dynamics accounted for most of variation:
    - primiparous = 65% replac. heifer, 27% beef price
    - multiparous = 47% replac. heifer, 45% beef price

- **Multiparous**
  - Stochastic analysis with multiyear data
  - Variable inputs: milk, feed, calf value, replacements, beef salvage value, repro cost, rbST

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**Stangaferro et al., unpublished**
Extending the VWP from 60 to 88 DIM resulted in:

- No statistically significant differences but numerical differences (+ stochastic analysis) may be of potential value to farms
  - primiparous → 88 d VWP benefited cash flow
  - multiparous → 60 d VWP benefited cash flow

- Replacement cost was greatest contributor to variation in cash flow (when using fixed and variable input costs)

- IOFC may play a major role for multiparous than primiparous cows – persistency of lactation

Thank you!

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