Herd Health and Production Medicine

Dr. Simon Kenyon
Large Animal Medicine

How to make money in food animal practice

- Drive faster so you can get more call-out fees per day
- Have clients with more sick animals so you make more money on each farm call.

Base your business success on the success of your client's business

- Traditional medicine is focused upon diagnostic and therapeutics of the individual animal with the assumption that if all the sick animals are handled properly, a healthy herd will result.

- Production medicine is focused upon the underlying herd management system with the assumption that if the production system that produced the problem is fixed, a healthy herd will result.

- If a group of cows are examined, pregnancies recorded, abnormalities treated, heats predicted, and left at that point, the reproductive program is traditional medicine directed at correcting the problems of many individual animals.
• If herd performance is summarized and charted, allowing management to make herd-based decisions, the reproductive program is production medicine.

Nomenclature (is a mess)
• Herd health
• Preventive Medicine
• Population Health
• Production Medicine
• Herd Health and Production Management

EVOLUTION OF PRODUCTION MEDICINE
• Area based disease control programs 1870’s

Specific Disease Control
• Mastitis – 5 point program
• Feedlot Respiratory Vaccines
• Infertility programs
  – Buy a TMR mixer
  – Improved feedbunk management
  – 4X milking
Evolution of Production Medicine

1870's
Area based disease programs

1940's
Individual animal treatment

1960's
Health programs for control of specific diseases

1980's
Integration of health maintenance with production management

Today
Integration of food safety, animal welfare and environmental management

Production Medicine

• Comparison of actual performance with agreed performance targets
• Importance of subclinical disease & production inefficiencies
• Importance of collection and analysis of production and health data
• Importance of integration of advice (e.g. disease, nutrition, economics, housing)

Production targets

• Internal targets:
  set using herd's historical data e.g. average daily milk production

• External targets:
  using district/state/national data from e.g. DHIA - “benchmarking”

Managing by averages

• Averages are not targets
• Much of the data is skewed e.g. repro. in a registered herd
• Averages may distort the relationship between different production parameters
**Barnyard Epidemiology**

- Interpretation of herd records as a basis for
  - Diagnosis and troubleshooting
  - Management and health planning
  - Monitoring

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**Transition Cow Problems**

- Toxic metritis
- Endotoxemia
- Decreased GI motility
- Vasoactive
- Decreased appetite
- Ketosis
- Hypocalcemia
- Laminitis
- Displaced abomasum

From Winkel, Tri-State Dairy Mgmt Conf., 1999

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**Figure 2. Effects of mastitis type before first insemination on days to first insemination, days open, and services per conception.**

In conclusion, subclinical mastitis was equal to clinical mastitis in its detrimental effect on reproductive performance of lactating cows.

J. Dairy Sci., 84:1407–1412

Influence of Subclinical Mastitis During Early Lactation on Reproductive Parameters

F. N. Schrick, M. E. Hocksett, A. M. Saxon, M. J. Lewis, N. H. Groslin, and S. P. Oliver
Department of Animal Science, Institute of Agriculture, The University of Tennessee, Knoxville, SF

Individual cow SCCs for two herds with same herd average SCC

<table>
<thead>
<tr>
<th>Cow</th>
<th>SCC</th>
<th>LS</th>
<th>KG</th>
<th>% CONTRIBUTION TO HERD</th>
<th>Herd A SCC</th>
<th>Herd B SCC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cow 1</td>
<td>106</td>
<td>3.1</td>
<td>30</td>
<td>9.5</td>
<td>237</td>
<td>29</td>
</tr>
<tr>
<td>Cow 2</td>
<td>89</td>
<td>2.8</td>
<td>32</td>
<td>8.5</td>
<td>321</td>
<td>23</td>
</tr>
<tr>
<td>Cow 3</td>
<td>164</td>
<td>3.7</td>
<td>24</td>
<td>11.7</td>
<td>254</td>
<td>30</td>
</tr>
<tr>
<td>Cow 4</td>
<td>985</td>
<td>6.3</td>
<td>21</td>
<td>61.5</td>
<td>356</td>
<td>16</td>
</tr>
<tr>
<td>Cow 5</td>
<td>176</td>
<td>3.8</td>
<td>17</td>
<td>8.9</td>
<td>232</td>
<td>30</td>
</tr>
</tbody>
</table>

Herd Avg SCC (x 1000) 271 271
Herd Avg LS 3.94 4.48
Herd Avg Milk kg 24.8 26.9
Milk Loss due to SCC kg 0.61 0.96
Total Potential Avg Milk kg 25.41 26.96

Targets and Interference Points

<table>
<thead>
<tr>
<th>Index Variable</th>
<th>Target</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voluntary wait period</td>
<td>60 days</td>
<td></td>
</tr>
<tr>
<td>Ave. calving to first service</td>
<td>83 days</td>
<td>95 days</td>
</tr>
<tr>
<td>Ave. calving to conception</td>
<td>120 days</td>
<td>140 days</td>
</tr>
<tr>
<td>Services/ conception</td>
<td>2.0</td>
<td>2.5</td>
</tr>
<tr>
<td>Calving Interval</td>
<td>13.2 months</td>
<td>14.0 months</td>
</tr>
<tr>
<td>Days Dry</td>
<td>60 days</td>
<td>65 days</td>
</tr>
<tr>
<td>Interservice interval (18-24 days)</td>
<td>60%</td>
<td>45%</td>
</tr>
</tbody>
</table>

The Veterinarian And Production Medicine

- Has the necessary veterinary skills
- Understands the production system
- Understands and uses data management techniques
- Can participate in and manage the advisory team
- Aware of the economics of production and the effects of disease
- Is a positive promoter of animal welfare, food safety and environmental protection
Can you make money doing this?

- Charge by the hour
- Focus on the health of the farm business
- Leverage your time with technician help
- Make money from healthy herds
- Avoid getting burnt out by having less emergencies and sick cow calls – ditch the bad farms, make money out of the good ones.
- Get involved in production management
- Program your day
- Invest in farm SOP
- Lead the farm team
  - Become the “go to person”
- Animal welfare makes money for the farmer

Vaccination programs for dairy calves

- 4-way respiratory disease virus vaccine is MLV
- Important to give 2 doses of MLV before first breeding for repro health
- Can vaccinate calves as early as 1 week with MLV 4 way (BRSV particularly important).
- Note: if calves are vaccinated early they still must be vaccinated at 4-6 months and before breeding

The three rations

1. The one the nutritionist designed
2. The one the farmer fed
3. The one the cow ate

Estimating Energy in Feeds

Energy & Fiber Constraints

Percent of Ration Dry Matter

<table>
<thead>
<tr>
<th></th>
<th>Early Lactation</th>
<th>Dry</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADF</td>
<td>&gt;17 – 21%</td>
<td>30 – 35%</td>
</tr>
<tr>
<td>NDF</td>
<td>&gt;28 – 30%</td>
<td>42 – 50%</td>
</tr>
<tr>
<td>NFC</td>
<td>&lt;40</td>
<td>30 – 40%</td>
</tr>
</tbody>
</table>
**Ration Ingredients**

<table>
<thead>
<tr>
<th>Total Mixed Ration</th>
<th>Protein</th>
<th>ADF%</th>
<th>NDF%</th>
<th>NEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>16-18</td>
<td>17-21</td>
<td>30</td>
<td>0.74</td>
<td></td>
</tr>
<tr>
<td>Grade 1 Hay</td>
<td>18</td>
<td>33</td>
<td>43</td>
<td>0.64</td>
</tr>
<tr>
<td>Corn Silage</td>
<td>8</td>
<td>28</td>
<td>48</td>
<td>0.67</td>
</tr>
<tr>
<td>Ground Corn</td>
<td>9</td>
<td>2.5</td>
<td>9</td>
<td>0.88</td>
</tr>
<tr>
<td>Soybean Meal</td>
<td>54</td>
<td>4</td>
<td>10</td>
<td>0.91</td>
</tr>
</tbody>
</table>

**Blue Moon Dairy ration**

For 1250 lb cows, mid-lactation, giving 90 lbs milk, 3.5% milk fat, 3.2% protein, gaining 1 lb/day

<table>
<thead>
<tr>
<th>As fed</th>
<th>lbs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2nd cutting haylage</td>
<td>8</td>
</tr>
<tr>
<td>Corn silage (BMR)</td>
<td>45</td>
</tr>
<tr>
<td>Dry hay</td>
<td>5</td>
</tr>
<tr>
<td>Whole cotton seed</td>
<td>5</td>
</tr>
<tr>
<td>Whole corn</td>
<td>10</td>
</tr>
<tr>
<td>Distillers dried grains</td>
<td>2</td>
</tr>
<tr>
<td>Custom protein mix</td>
<td>3.7</td>
</tr>
<tr>
<td>48% soybean meal</td>
<td>4</td>
</tr>
<tr>
<td>Mineral/vitamin mix</td>
<td>2</td>
</tr>
<tr>
<td>Urea</td>
<td>0.25</td>
</tr>
</tbody>
</table>

**Concentrations %**

<table>
<thead>
<tr>
<th>Dry matter</th>
<th>Crude protein</th>
<th>ADF</th>
<th>NDF</th>
<th>NFC</th>
<th>RUP</th>
<th>Ca</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>55</td>
<td>18.90</td>
<td>18.17</td>
<td>28.51</td>
<td>41.12</td>
<td>34.9</td>
<td>0.94</td>
<td>0.45</td>
</tr>
</tbody>
</table>

**Total as fed**

- 85 lbs
- Ration DM: 47 lbs
- Forage: concentrate: 50 lbs
- Feed cost/day: $3.00

**Chuck Harkinson**

- Milks 124 cows
- New milking parlor and free stall barn with 184 stalls
- Minimal herd records
- Breeding problems/herd expansion
- Feeds 1 group TMR, for 75 lbs milk

**Presenting complaint**

17 early LDA's since July

Secondary complaints:
- Metritis/retained placentas
- Cows off feed after calving
- Lameness
- Increased numbers of older cows with post-parturient hypocalcemia (milk fever)

**Herd expansion problems**

- Farmers tend to keep problem cows in order to fill the barn during herd expansion.
- Leads to animal health problems the following year
Reproductive Performance Targets

- Days to 1st insemination: 75 days
- Services/conception: 2.0
- Days open (days to conception): 120
- Calving Interval: 400 days (13.2 months)
- Days dry: 60 days

Transition Cow Problems

- Toxic metritis
- Endotoxemia
- Decreased GI motility
- Vasoactive
- Decreased appetite
- Ketosis
- Fat cow syndrome
- Laminitis
- Alkalosis
- Hypocalcemia
- Displaced abomasum

From Welker, Tri-State Dairy Mgmt Conf., 1999

Herd average production 65 lbs milk/day

Lactating cow ration:
- Corn silage
- Colorado alfalfa hay
- Grain mix
- Distillers dried grains
- Vitamins & Minerals
- Na HCO₃, Zinpro

Making a ration

Penn State Forage Separator

Proximate analysis – corn silage

Rule of thumb for corn silage

Post – ADF - NDF
5 – 24 – 48
Hay Quality
Relative Feed Value (RFV)

<table>
<thead>
<tr>
<th>Animal Type</th>
<th>Alfalfa Quality</th>
<th>RFV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calf 2-3mths</td>
<td>Very High</td>
<td>&gt; 140</td>
</tr>
<tr>
<td>Heifer 3-12 mths</td>
<td>High</td>
<td>125-145</td>
</tr>
<tr>
<td>Heifers 12-18 mths</td>
<td>Medium</td>
<td>115-130</td>
</tr>
<tr>
<td>Heifers, Dry Cows</td>
<td>Low</td>
<td>100-115</td>
</tr>
<tr>
<td>Early Lactation</td>
<td>Very High</td>
<td>&gt; 140</td>
</tr>
<tr>
<td>Late Lactation</td>
<td>Medium</td>
<td>125-145</td>
</tr>
</tbody>
</table>

Proximate analysis – Colorado hay

- Quality – super prime
- RFV = 163
- Potassium: 2.83%

Identify problems
- Dry cow ration?
- Fresh cows?

Recommendations
- New forage chopper (preferably with kernel processor to break the grains open). ¾” theoretical length of cut
- Feed TMR to dry cows (CS, chopped straw, hay)
- Add cottonseed to the ration
- House fresh cows separately.
- Fresh cow TMR with extra hay or feed extra loose hay (esp. grass hay)
Corn Silage Chop Length

- Theoretical Length of Cut
- TLC traditionally 3/8"
- Prefer 1/2” TLC for adequate fiber length
- 3/4” TLC if using kernel processor
- Kernel processor crushes kernels, improves digestibility, but reduces effective fiber.

Substituting grass for alfalfa in fresh cows

<table>
<thead>
<tr>
<th>Forage</th>
<th>CP</th>
<th>NDF</th>
<th>NDFD</th>
<th>NFC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn silage</td>
<td>9</td>
<td>41</td>
<td>68</td>
<td>27.5</td>
</tr>
<tr>
<td>Alfalfa</td>
<td>20</td>
<td>40</td>
<td>48</td>
<td>27.5</td>
</tr>
<tr>
<td>Orchardgrass</td>
<td>16</td>
<td>60</td>
<td>60</td>
<td>11.5</td>
</tr>
</tbody>
</table>

Summary

- Not expected to be the herd nutritionist
  - But
  - Need to know enough nutrition and feeding management to be able to troubleshoot nutritional management.
  - Need to be able to lead the management advisory team
  - Need to be able to take forage samples correctly and interpret results of forage analysis
  - Need to know enough nutrition have an intelligent conversation with the farm nutritionist
  - Useful to be able to run trial rations on a computer program

Beef Cattle Practice

- Cow-calf and small feedlot
- Large cow-calf operations
- Feedlot practice
Technology Utilization - Beef Cow calf

<table>
<thead>
<tr>
<th>Technology</th>
<th>% herds using</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herd records*</td>
<td>83</td>
</tr>
<tr>
<td>ID*</td>
<td>66</td>
</tr>
<tr>
<td>Castration*</td>
<td>59</td>
</tr>
<tr>
<td>&lt;$5 month breeding season</td>
<td>47</td>
</tr>
<tr>
<td>BSE bulls</td>
<td>40</td>
</tr>
<tr>
<td>Precondition calves</td>
<td>36</td>
</tr>
<tr>
<td>Palpate cows</td>
<td>35</td>
</tr>
<tr>
<td>Balance rations</td>
<td>22</td>
</tr>
<tr>
<td>Artificial insemination</td>
<td>13</td>
</tr>
<tr>
<td>SPA (financial records)</td>
<td>4</td>
</tr>
</tbody>
</table>

1997 and 2008* NAHMS data

Cow-calf

- Aim: maximize number of calves sold
  1. Maintain reproductive efficiency
  2. Minimize calf morbidity and mortality
  3. Keep cows cheaply over the winter
  4. Market a calf that somebody wants to buy

General Information Sources for Beef Operations

<table>
<thead>
<tr>
<th>Source of info</th>
<th>Very Important</th>
<th>Somewhat Important</th>
<th>Not Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ext/Univ/Vo-Ag</td>
<td>20.7</td>
<td>43.5</td>
<td>35.8</td>
</tr>
<tr>
<td>Veterinarians</td>
<td>53.1</td>
<td>31.7</td>
<td>15.2</td>
</tr>
<tr>
<td>Beef mag/Ag journal</td>
<td>16.3</td>
<td>47.2</td>
<td>36.5</td>
</tr>
<tr>
<td>Producer/Breed Assoc</td>
<td>13.2</td>
<td>31.1</td>
<td>55.7</td>
</tr>
<tr>
<td>Other producers</td>
<td>23.7</td>
<td>45.2</td>
<td>31.1</td>
</tr>
<tr>
<td>Salespersons</td>
<td>11.7</td>
<td>31.5</td>
<td>56.8</td>
</tr>
<tr>
<td>Consultants</td>
<td>4.9</td>
<td>12.2</td>
<td>82.9</td>
</tr>
<tr>
<td>Radio, TV, News</td>
<td>5.8</td>
<td>26.3</td>
<td>67.9</td>
</tr>
</tbody>
</table>

NAHMS 2008

Beef Production Medicine according to Dr. Mark Hilton

- Beef cows are NOT small, unproductive dairy cows.
- Goal of beef herd is how to save $1 to increase net by $1.
- Goal of dairy herd is to spend $1 to produce $2 worth of milk so we can net $1.
- Beef cows are “scavengers”, dairy cows are “factories”. Very different mind set when working with beef vs. dairy.

Beef Herd Production Goals

- Calf crop: 90%+
  - Calving interval: 365 days
  - % calves born by 21,42,65 days: 65:88:100
  - % in heat by 60 days postcalving: 80%
  - Calf weaning weight: 45-50% of cow weight
  - Dystocia: <5% cows, <15% heifers
  - Length of breeding season: 65 days cows, 42 days heifers
  - % pregnancy rate: 90-95% cows, 90% heifers

Dairy basics

**Rule #1**

Make more milk

**Rule #2**

Reduce costs (as long as it does not interfere with rule #1)
**Beef Herd Production Goals, con’t**

- Average age at weaning: 150-180 days
- % crossbred cows: 100%
- Average cow age: 7-8 years
- Average culling rate: 5-10%
- Herd profit: >$100/cow/year

**Hilton’s Philosophy**

“Our task as the herd health veterinarian is to take a history, perform a physical exam of the herd and the business, analyze the research and then make the best recommendations based on these facts.”

“The owner’s task is to take our information and make the ‘best’ decisions.”

**Goal Of Production Medicine**

- Have the producer see the veterinarian as an asset to the operation.
- See us as someone to ask about ANY aspect of their business. (We don’t have all the answers, but we know who to ask for answers to their questions.)
- Primarily dealing with cattle owners that see themselves as running a business.

**Business attitude**

- Where are we? → Records
- Where will we go? → Targets
- How do we compare? → Benchmarking
- How will we get there? → Analysis

“How will you and I know when I’m doing the job you expect me to do?”

**Preconditioning**

Carried out by cow-calf producer:

- males castrated
- vaccinated (MLV initial + booster)
- feed bunk acclimated
- weaned 45 days

*Hefers from single ranch, MLV vaccinated + boosters, 45 days weaned: Death loss 1.3% vs 4.4% $30 less medicine $60 net return Cravey MD, 1996

The Value Added Calf:
- preconditioned
- value marketed
- quality assured (injection sites)
- individual ID
- source verified
- age verified

**Cow Feedlot Calf**

- Birth
- 6 months
- Weaning
- Sale
- 12 months
- Calving

- Intranasal IBR/PI3
- 4-way Virus
- BVD, IBR, PI3, BRSV

- Dehorn
- Castrate

- Best time
Feedlot near Dodge City, SD

Stocker calves at pasture