VM 577P Herd Production Medicine

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Epidemiologist, WSU AAHP FDIU

Goals:
Discuss:
• The opportunities in major livestock industries
• Some discordant information AND
• How to be worth $100K your first year out

Assumptions:
• Information empowers you to make the best choices
• He who understands best how their part of the world works and can demonstrate this understanding do the best
• Some have a too narrow and somewhat mistaken view of how their part of the world works

Who is FSV’s Ultimate Client?
(Food Supply Veterinary Medicine)

The Consumers
Anyone in the supply chain who ignores this does so at their (and their client’s) peril!
• Producer
• Veterinarian
• Processor
• Marketer
• Service Establishment

The Ultimate FSV Client

Public’s Perspective:
Society’s expectation of FSV veterinarians:
1. First as independent agents for the animals
2. Second as acting in their clients’ interests

When gaps occur between these expectations, someone else fills it!
Public Risk Perception is not Straightforward!

Which are the jackhammers and which are the cigarettes?

Emotional perception trumps rational science every time

Which are the jackhammers and which are the cigarettes?

Emotional perception trumps rational science every time

Result of the consumer being the end of the chain:

- Government is a much larger influence in agricultural animal medicine than for pet medicine
- The relationship between the veterinarian and the producer in food animal agriculture is different from non-agricultural animal species (horses, dogs, cats)
- Two additional parties – the consumer (indirectly) and the government (directly)
- Result – Both Threats and Opportunities!

How much are new DVMs paid?

Depends on:
- Species interest
- Geographic area (Location, location, location)
- Work ethic and Attitude
- Individual competency
- Passion!

For Comparison - Owner Net Income (2005)

<table>
<thead>
<tr>
<th>Practice Type</th>
<th>Median Net Income</th>
<th>Average Net Income</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Animal Exclusive</td>
<td>$100,226</td>
<td>$180,486</td>
</tr>
<tr>
<td>Large Animal Exclusive</td>
<td>$120,150</td>
<td>$180,159</td>
</tr>
<tr>
<td>Small Animal Predominate</td>
<td>$131,195</td>
<td>$140,589</td>
</tr>
<tr>
<td>Mixed Animal</td>
<td>$121,093</td>
<td>$154,408</td>
</tr>
<tr>
<td>Large Animal Predominate</td>
<td>$112,011</td>
<td>$155,741</td>
</tr>
<tr>
<td>Equine</td>
<td>$109,671</td>
<td>$173,383</td>
</tr>
</tbody>
</table>

New Graduate Salaries (2008)

<table>
<thead>
<tr>
<th>Employment Type</th>
<th>New Graduates</th>
<th>Ave. Compensation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Animal Exclusive</td>
<td>32% (425)</td>
<td>$70,429</td>
</tr>
<tr>
<td>Large Animal Exclusive</td>
<td>3% (43)</td>
<td>$69,796</td>
</tr>
<tr>
<td>Small Animal Predominate</td>
<td>7% (120)</td>
<td>$67,478</td>
</tr>
<tr>
<td>Uniformed Services</td>
<td>2% (30)</td>
<td>$66,467</td>
</tr>
<tr>
<td>Mixed Animal</td>
<td>10% (157)</td>
<td>$64,296</td>
</tr>
<tr>
<td>Large Animal Predominate</td>
<td>3% (47)</td>
<td>$63,500</td>
</tr>
<tr>
<td>Equine</td>
<td>3% (56)</td>
<td>$45,944</td>
</tr>
<tr>
<td>Advanced Study</td>
<td>40% (651)</td>
<td>$28,744</td>
</tr>
</tbody>
</table>

New Graduate Salaries (2008)

<table>
<thead>
<tr>
<th>Employment Type</th>
<th>&lt; $50,000</th>
<th>&gt; $75,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small Animal Exclusive</td>
<td>9%</td>
<td>22%</td>
</tr>
<tr>
<td>Large Animal Exclusive</td>
<td>14%</td>
<td>12%</td>
</tr>
<tr>
<td>Small Animal Predominate</td>
<td>17%</td>
<td>13%</td>
</tr>
<tr>
<td>Uniformed Services</td>
<td>17%</td>
<td>13%</td>
</tr>
<tr>
<td>Mixed Animal</td>
<td>17%</td>
<td>4%</td>
</tr>
<tr>
<td>Large Animal Predominate</td>
<td>15%</td>
<td>4%</td>
</tr>
<tr>
<td>Equine</td>
<td>68%</td>
<td>2%</td>
</tr>
<tr>
<td>Advanced Study</td>
<td>99%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Where is the cattle work?

- Dairy or Beef
- Geographic area

Top Beef States (2008):

<table>
<thead>
<tr>
<th>State Rank</th>
<th>Beef Cow Inventory</th>
<th>% U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Texas</td>
<td>5,480,000</td>
<td>17%</td>
</tr>
<tr>
<td>2) Missouri</td>
<td>2,116,000</td>
<td>6%</td>
</tr>
<tr>
<td>3) Oklahoma</td>
<td>2,047,000</td>
<td>6%</td>
</tr>
<tr>
<td>4) Nebraska</td>
<td>1,934,000</td>
<td>6%</td>
</tr>
<tr>
<td>5) South Dakota</td>
<td>1,696,000</td>
<td>5%</td>
</tr>
<tr>
<td>6) Kansas</td>
<td>1,518,000</td>
<td>5%</td>
</tr>
<tr>
<td>7) Montana</td>
<td>1,432,000</td>
<td>4%</td>
</tr>
<tr>
<td>8) Kentucky</td>
<td>1,110,000</td>
<td>3%</td>
</tr>
<tr>
<td>9) Tennessee</td>
<td>1,106,000</td>
<td>3%</td>
</tr>
<tr>
<td>10) Iowa</td>
<td>992,000</td>
<td>3%</td>
</tr>
<tr>
<td>Top Ten States</td>
<td>19,431,000</td>
<td>59%</td>
</tr>
<tr>
<td>U.S.</td>
<td>32,983,300</td>
<td>(15%)</td>
</tr>
</tbody>
</table>

Where are the Feedlots?

~15 million head

http://www.nass.usda.gov/research/atlas02/index.html

Where is the Cow-calf work?

~30 million calved cows

http://www.nass.usda.gov/research/atlas02/index.html

Where is the dairy work?

~9 million dairy cows

http://www.nass.usda.gov/research/atlas02/index.html

Top Dairy States (2008):

<table>
<thead>
<tr>
<th>State Rank</th>
<th>Dairy Cow Inventory</th>
<th>% U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) California</td>
<td>1,846,000</td>
<td>21%</td>
</tr>
<tr>
<td>2) Wisconsin</td>
<td>1,252,000</td>
<td>15%</td>
</tr>
<tr>
<td>3) New York</td>
<td>626,000</td>
<td>7%</td>
</tr>
<tr>
<td>4) Idaho</td>
<td>556,000</td>
<td>7%</td>
</tr>
<tr>
<td>5) Pennsylvania</td>
<td>546,000</td>
<td>6%</td>
</tr>
<tr>
<td>6) Minnesota</td>
<td>463,000</td>
<td>5%</td>
</tr>
<tr>
<td>7) Texas</td>
<td>383,000</td>
<td>5%</td>
</tr>
<tr>
<td>8) Michigan</td>
<td>348,000</td>
<td>4%</td>
</tr>
<tr>
<td>9) New Mexico</td>
<td>338,000</td>
<td>4%</td>
</tr>
<tr>
<td>10) Ohio</td>
<td>262,000</td>
<td>3%</td>
</tr>
<tr>
<td>Top Ten States</td>
<td>6,646,000</td>
<td>78%</td>
</tr>
<tr>
<td>U.S.</td>
<td>8,465,000</td>
<td></td>
</tr>
</tbody>
</table>
But Current Headlines:

- Vet shortage threatens food system
  USA TODAY, 2/2/9/08
- Shortage of vets taxes farmers
  News Journal, 10/20/08
- Dearth of docs: Large-animal veterinarians are in short supply
  The Coloradoan, 10/12/08
- NE facing shortage of large animal vets
  Fox44 News, 10/3/08

Where is the Cow-calf work?

~30 million calved cows

1 dot = 5,000 cows

http://www.nass.usda.gov/research/atlas02/index.html

What is going on here?

Economics!
Driving many Producer Choices

http://www.nass.usda.gov/research/atlas02/Livestock/Hogs%20and%20Pigs/Hogs%20and%20Pigs%20-%20Inventory.gif

http://www.nass.usda.gov/research/atlas02/index.html
**Where is the beef cow-calf work?**

<table>
<thead>
<tr>
<th>Herd Size</th>
<th>Primary Income</th>
<th>Supplemental Income</th>
<th>Non-economic</th>
<th>Used vet in year</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 50</td>
<td>5%</td>
<td>72%</td>
<td>22%</td>
<td>47%</td>
</tr>
<tr>
<td>50 - 99</td>
<td>26%</td>
<td>69%</td>
<td>4%</td>
<td>72%</td>
</tr>
<tr>
<td>100 - 300</td>
<td>50%</td>
<td>47%</td>
<td>3%</td>
<td>79%</td>
</tr>
<tr>
<td>&gt; 300</td>
<td>79%</td>
<td>17%</td>
<td>4%</td>
<td>83%</td>
</tr>
</tbody>
</table>

*Pareto Rule: 80% of business is from 20% of clients*

**Cow-calf Economics:**

1978 Montana study:
- To generate $6,000 of family income (new car, college tuition, groceries) per year over 25 years, a commercial cow-calf ranch had to have at least 300 calving cows
- 2008 equivalent $20,133 ($67 per calving cow)

2006 University of Minnesota study:
- The average farm family (3.4 persons) average annual family expense was $64,046
- Based on five year average returns a herd size of 815 to 1,357 cows was required to generate this income ($47 - $79 per calving cow)

These economics likely explain veterinary usage

**Montana Beef Demographics (2002)**

<table>
<thead>
<tr>
<th>Herd Size</th>
<th># Beef Herds</th>
<th>% of All Herds</th>
<th># Beef Cows</th>
<th>% of All Cows</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 9</td>
<td>1,961</td>
<td>17%</td>
<td>9,162</td>
<td>1%</td>
</tr>
<tr>
<td>10 - 19</td>
<td>1,231</td>
<td>10%</td>
<td>17,452</td>
<td>1%</td>
</tr>
<tr>
<td>20 - 49</td>
<td>2,403</td>
<td>20%</td>
<td>17,108</td>
<td>5%</td>
</tr>
<tr>
<td>50 - 99</td>
<td>1,912</td>
<td>16%</td>
<td>136,055</td>
<td>9%</td>
</tr>
<tr>
<td>100 - 199</td>
<td>1,977</td>
<td>17%</td>
<td>274,782</td>
<td>18%</td>
</tr>
<tr>
<td>200 - 499</td>
<td>1,630</td>
<td>15%</td>
<td>543,227</td>
<td>36%</td>
</tr>
<tr>
<td>500 - 999</td>
<td>383</td>
<td>3%</td>
<td>247,811</td>
<td>16%</td>
</tr>
<tr>
<td>1K - 2.499</td>
<td>117</td>
<td>1%</td>
<td>171,701</td>
<td>11%</td>
</tr>
<tr>
<td>&gt; 2.500</td>
<td>7</td>
<td>0%</td>
<td>27,893</td>
<td>2%</td>
</tr>
<tr>
<td>11,821</td>
<td>1,505,191</td>
<td>127 Head</td>
<td>(US 43 Head)</td>
<td></td>
</tr>
</tbody>
</table>

**Idaho Dairy Demographics (2002)**

<table>
<thead>
<tr>
<th>Herd Size</th>
<th># Dairy Herds</th>
<th>% of All Herds</th>
<th># Dairy Cows</th>
<th>% of All Cows</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 9</td>
<td>260</td>
<td>26%</td>
<td>431</td>
<td>0.1%</td>
</tr>
<tr>
<td>10 - 19</td>
<td>17</td>
<td>2%</td>
<td>229</td>
<td>0.05%</td>
</tr>
<tr>
<td>20 - 49</td>
<td>95</td>
<td>10%</td>
<td>3,347</td>
<td>1%</td>
</tr>
<tr>
<td>50 - 99</td>
<td>170</td>
<td>17%</td>
<td>11,817</td>
<td>3%</td>
</tr>
<tr>
<td>100 - 199</td>
<td>121</td>
<td>12%</td>
<td>15,503</td>
<td>4%</td>
</tr>
<tr>
<td>200 - 499</td>
<td>134</td>
<td>14%</td>
<td>41,251</td>
<td>11%</td>
</tr>
<tr>
<td>500 - 999</td>
<td>79</td>
<td>8%</td>
<td>53,099</td>
<td>14%</td>
</tr>
<tr>
<td>&gt; 1000</td>
<td>106</td>
<td>10%</td>
<td>264,923</td>
<td>67%</td>
</tr>
<tr>
<td>982</td>
<td>390,600</td>
<td>398 Head</td>
<td>(US 99 Head)</td>
<td></td>
</tr>
</tbody>
</table>

**Where is the dairy veterinary work?**

<table>
<thead>
<tr>
<th>No. Visits</th>
<th>&lt; 100 cows (106)</th>
<th>100 - 199 cows (384)</th>
<th>200+ cows (422)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 6</td>
<td>27%</td>
<td>14%</td>
<td>10%</td>
</tr>
<tr>
<td>7 - 12</td>
<td>22%</td>
<td>14%</td>
<td>12%</td>
</tr>
<tr>
<td>13 - 24</td>
<td>31%</td>
<td>24%</td>
<td>21%</td>
</tr>
<tr>
<td>&gt; 24</td>
<td>20%</td>
<td>48%</td>
<td>58%</td>
</tr>
</tbody>
</table>

*USDA NAHMS Dairy ’96: Part I, page 23*

Much more work per herd

**Key Industry Facts:**

- 19% of consumer food expenditure is the farm value
- 10 largest retailers have 58% of food sales and 81% of supermarket sales
  1. 25% - Walmart
  2. 21% - Kroger
  3. 8% - Safeway
  4. 6% - Costco
- 5 largest packers process 85% of the fed cattle
- 25 largest feeding organizations produce 40% of the fed cattle
- 8% of cow-calf operations own 51% of beef cows
- 1 of every 12 head is Holstein, 1 of every 8 head is a dairy breed, 50% of dairy beef is sold as whole muscle cuts
- Costs of farm inputs are increasing dramatically
Cow-calf: Very volatile business

Comparing Vet Lack to Beef Cattle:
Pattern strongly suggests conventional beef practice has to change to be viable!

Impact of Changing Technology
Double 6 Herringbone Parlor
80 Cow Rotary Parlor
Rotaries likely hold more cows than were on an entire dairy with a small Herringbone

Impact of Changing Technology
The breeds of many ranch "horses" are now Honda, Polaris, Suzuki and Yamaha

Trends of beef & dairy industry
Declining herd numbers, increasing herd size

Operation Size Effect:
Suppose 1 cow is affected every 300 cow years:
- 30-cow dairy has ~1 case every 10 years
- 300-cow dairy has ~1 case per year
- 3,000-cow dairy has ~10 cases per year
As size increases, employees:
- Specialize in specific tasks, becoming more skilled
- Handle a broader range of conditions
- Specific health events become more frequent for the employee
  - Better at recognizing a particular problem earlier
  - More likely to develop sufficient skills to handle it
With increasing size, the veterinarian:
- Becomes less of a “doer” and more of a trainer of the “doer”
- Involved more in the selection, training, and monitoring of employees for management
  - Traditional role of feedlot veterinarians
- Develops farm-specific standardized operating protocols (SOP) that are executed by employees
  - Managers moving toward more business management and less hands on
  - More consistent practices in critical areas
  - Better preventive practices reduce treatment needs
- Fewer veterinarians cover more cows
  - Midwest – small dairy herds: 1 vet to 6,000 cows
  - New Mexico – large dairy herds: 1 vet to 20,000+ cows

**Prevention beats a cure every time**

- Prevention Cost << Treatment Cost
- $$$ forcing Ag Animal Veterinary Medicine to shift to a prevention focus to survive

**Veterinarian’s Primary Role:** (Production vs. Traditional)

<table>
<thead>
<tr>
<th>Adviser and educator</th>
<th>Hands-on “doer”</th>
</tr>
</thead>
</table>

**Visit Trigger:**

- Regularly scheduled
- Called as needed “fire engine”

**Problem Detection:**

- Record-based detection of sub-optimal performance
- Visual detection of clinical illness

**Application of Treatment:**

- Employee trained to treat routine cases
- Veterinarian treats routine case

**Evaluation of Outcome:**

- Economic performance
- Visible difference (healthy vs. sick)

**Potential Economic Impact:**

- Great if entire group affected
- Small – individual animal salvage

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**On unoriginal thoughts:**

The secret to creativity is knowing how to hide your sources

Albert Einstein

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**On the other hand:**

If you can’t dazzle them with dexterity, baffle them with bullshit.

Professor H. Hill
My Perspective:

BSME, MBA core

Entrepreneurship
Two pronged strategy: Skill vs. Knowledge

- Become economically competitive at doing the expected and market to the big herds
  - Fast palpation, bull BSE’s, heifer spays, . . .
- Develop new opportunities by developing specialized expertise
  - Grazing management, employee training and SOP’s

Perform “SWOT Analysis” (Strengths, Weaknesses, Opportunities, Threats)

Producer vs. Veterinary Perception of Services

Services producer thinks vet should provide
Services that benefit both!

Emerging Discordance

Traditional Veterinary Services (traditional curriculum)

Leaders move these

Changing Technology
- Ultrasound
- Genetic analysis

Entrepreneurs move this

Services producer thinks vet should provide
Services that benefit both!

Going forward by watching the rearview mirror only works if the road is straight!

How to “Get to $100K from Here”:
Becoming an outstanding bovine veterinarian

Outside of Coursework:
- Learn how to maximize your learning efforts
  - university teaching and learning services and websites
    - e.g., Wirth & Perkins “Learning to Learn”
  - Spend at least one summer under a mentor working with the labor on a 2,000+ cow operation
    - If you don’t know it, learn Agricultural Spanish
  - Join Toastmasters to learn how to communicate well verbally
  - Practice leadership skills by joining student clubs and seeking leadership positions
  - Regularly scan relevant trade magazines and websites
  - Identify and become economically competent in the important veterinary knowledge and skills
    - Practice, practice, practice – 50+ hours to gain minimal competence with a new skill

How to “Get to $200K from Here”:
Becoming an outstanding veterinary entrepreneur

Learn:
- Basics of the food supply system components
  - Soils, crops, animals, environment, farm input and food supply chains
- Applied agricultural economics courses
  - Learn production accounting systems and analysis of data from them
    - Become an Excel maven!
  - All the ruminant nutrition that you can
    - ~ 50% of production cost
  - All the reproductive physiology that you can
    - Begin learning early to palpate, synchronize and to do AI!
  - Learn the content of the capstone farm management courses
Why applied animal science / farm management?

- Important decisions always involve economics and risk
- Not understanding economics of alternatives makes veterinarian much less useful to producers
- Much of the allied industry "competition" has this academic background

Field and Taylor, 5th ed.

Beef Cow Production Cycle

- Anchored by matching:
  - Cow gestation period
  - Cow milk yield curve
  - Pasture growth cycle

Northern Intermountain Feed Cycle

- Winter Feed: Jan 1
- Hay is typically 70% of feed costs, 40% of total operating costs
- Grazing is typically 30% of feed costs
- Feed is > 50% of ranch operating costs

Cow Production Cycle w/ Feed

- Critical Cow Nutrition Period
  - Late Gestation, Early Lactation
  - Breeding

Adding veterinary component

- Bovine Respiratory Disease
- Pregnancy Testing
- Replacement Brucellosis Vaccination
- Calf Scours
- Dystocia
- Trichomoniasis

Know the key factors affecting profit

Cow-Calf Profit =

<table>
<thead>
<tr>
<th>Weaning weight</th>
<th>Calf Crop %</th>
<th>Market Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weaning weight</td>
<td>Calf Crop %</td>
<td>Market Price</td>
</tr>
</tbody>
</table>

| Growth Rate | Maternal Ability | Season |
| Milk Production | Bull & Dam Fertility | Demand |
| Environmental Adaptation | Dystocia | Management Ability |
| Health | Carcass Characteristics |

Blue = Areas associated with veterinary medicine
Opportunities with conventional producers

<table>
<thead>
<tr>
<th></th>
<th>High return producers</th>
<th>Low return producers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calf Breakeven</td>
<td>$75</td>
<td>$148</td>
</tr>
<tr>
<td>Grazing &amp; Feed Cost</td>
<td>$139</td>
<td>$216</td>
</tr>
<tr>
<td>Annual Cow Cost</td>
<td>$343</td>
<td>$595</td>
</tr>
<tr>
<td>Weaning %</td>
<td>85%</td>
<td>80%</td>
</tr>
<tr>
<td>Avg. Weaning Wt</td>
<td>539 lbs</td>
<td>502 lbs</td>
</tr>
<tr>
<td>Net Return per Cow</td>
<td>$141</td>
<td>-$250</td>
</tr>
</tbody>
</table>

Impact of 10% change in key factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Change (%)</th>
<th>Decrease in Breakeven ($/cwt)</th>
<th>Increase in Return ($/cow)</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Weaned Calf Crop</td>
<td>+10%</td>
<td>$7.87</td>
<td>$39.82</td>
</tr>
<tr>
<td>Weaning Weight</td>
<td>+10%</td>
<td>$6.62</td>
<td>$33.47</td>
</tr>
<tr>
<td>Total Feed Cost</td>
<td>-10%</td>
<td>$4.27</td>
<td>$21.58</td>
</tr>
<tr>
<td>Cull Cow Weight</td>
<td>+10%</td>
<td>$1.00</td>
<td>$5.98</td>
</tr>
<tr>
<td>Interest Cost</td>
<td>-10%</td>
<td>$0.18</td>
<td>$0.93</td>
</tr>
<tr>
<td>All Combined</td>
<td></td>
<td>$19.94</td>
<td>$100.88</td>
</tr>
</tbody>
</table>

Know critical periods in production cycle

- Calving – dystocia, calf scours
- Breeding – infertility (nutritional, infectious)
- Weaning – bovine respiratory disease

<table>
<thead>
<tr>
<th>Percent of Annual Deaths</th>
<th>Calves</th>
<th>Cows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dystocia</td>
<td>33%</td>
<td>26%</td>
</tr>
<tr>
<td>Calf Scours</td>
<td>17%</td>
<td></td>
</tr>
<tr>
<td>Calf Pneumonia</td>
<td>10%</td>
<td></td>
</tr>
</tbody>
</table>

Herd production management and medicine texts:

- Chenoweth & Sanderson “Beef Practice”
- Radostits “Herd Health”, 3rd ed.

What is the veterinary student who wants to serve a livestock industry to do?

- Where should one develop expertise?
  - Developing expertise takes investment of scarce time at the expense of something else
- Avocation vs. vocation?

Veterinary Entrepreneurs:
- Identify opportunities and take the risk to develop them

Veterinary Leaders:
- Motivate others to change

Followers:
- The rest of us

How to “Get There from Here”:
Becoming an outstanding livestock veterinarian

While in veterinary school:
- Know the upper division applied animal science / farm management materials
- Buy and read the herd production management and medicine texts
- Become an Excel maven
- Identify and take the relevant elective blocks at other schools
- Learn Spanish
- Identify the important veterinary knowledge and skills and begin working on becoming economically competent early!
FSV skill and competency lists:

- Diagnosis and treatment of food animal educational diseases (JAVMA 193:1066-1068, 1988)
- Individual animal medicine and animal production skills expected of entry-level veterinarians in bovine practice (JAVMA 223(1):959-68, 2002)
- Surgery, anesthesia, and restraint skills expected of entry-level veterinarians in bovine practice (JAVMA 223(7):969-974, 2002)
- U Missouri FADACUM - Competencies, Proficiencies
- U Sydney Observations on Property Management
- Practitioner Input on Competencies
- Practice, Practice, Practice!

Be careful of the rearview mirror phenomenon!

"Prediction is very difficult, especially about the future" – Niels Bohr, Danish physicist

Antimicrobial Drug Resistance: "Prediction Is Very Difficult, Especially about the Future"


"GTfH": Information Sources

While in veterinary school:

- Join the relevant professional organizations as a student member
- Pay attention to "Practitioners of the Year" or their equivalent selected annually by the practitioner organizations
  - Their peers have identified them as outstanding in their area
- Identify progressive practitioners doing what you want to do at a high level and ask to go see how they do it and pick their brain for advice
- Seek out veterinarians successfully managing large, modern livestock operations
  - They know both what you are learning and what you aren’t but need to
- Regularly scan the relevant industry trade journals, either on-line or by subscription