Food supply veterinary medicine

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• The study does not describe the number of new graduates needed in each sector of FA veterinary medicine. This is not feasible as FA industries are undergoing rapid transition & available veterinary data is inconsistent.

• The profession’s goal should be to ensure the safety of foods of animal origin & provide producers with the most sophisticated and environmentally responsible care of food animals that is possible.

• The profession should better serve the needs of rural America.
Why are there shortages in the FA workforce workforce?

Source, AVMA
Demographics; Population changes, 1990 to 2000

Available at: http://www.nationalatlas.gov/articles/people/a_popchange.html
The decline in rural population and shortage of veterinarians in the high plains of America are strikingly parallel.

The quality of life in rural America is described as deteriorating. Consolidation of the livestock and poultry industries has contributed to this.

Populations in rural America are not only declining, there is also rising poverty, especially throughout Appalachia and the South.
• Once flourishing communities in rural America are described as suffering from “a slow acting wasting disease” (Carr & Kefalas 2009, Artz, 2003, Romer & Wolverton 2010)

• As a result, the rural middle class of merchants, bankers, and professionals has left (Carr & Kefalas 2009)

• This has contributed to rising unmet needs in animal health & welfare & environmental stewardship
Shortages in the FA workforce
Poverty in Rural America, 2008

Percent in Poverty
(White areas are urban counties.)

Highest
Ziebach County, SD 54.4%

National Average 13.2%

Lowest
Los Alamos County, NM 3.1%

54.4% to 25%
25% to 20%
20% to 14.3%
14.2% to 12.2%
12.1% to 10%
10% to 3.1%

Source, Daily Yonder Census
The 1982 NRC report “Specialized Veterinary Manpower Needs Through 1990” noted “the problem is in large part a matter of the economics of FA veterinary practice, areas with perceived shortages commonly do not provide satisfactory remuneration.” and asked

“are unmet needs for FA veterinarians in rural America because of economic circumstances or are there real shortages with adequate compensation but inadequate numbers of FA veterinarians?”

The question is even more relevant today than it was in 1982,

A goal of the profession should be to deliver health care to the largest possible FA population in rural America

To accomplish this, a new system for veterinary health care delivery is needed for rural America
Practitioner demographics. Recruitment of new graduates and aging of the FA veterinary workforce.
Between 1989 & 2009, the # of new graduates entering large animal predominant practice plummeted by over 70%. As a result, this cohort is rapidly aging.

Source, AVMA data
Age Groups within **Food-Animal-Exclusive Practice**, In 2007 fifty percent were fifty or older.

Age Groups within **Food-Animal-Predominant Practice**, In 2007 fifty nine percent were fifty or older.

Age Groups within **Mixed Food Animal Practice**, In 2007 forty three percent were 50 or older.

Source from AVMA data
Industry consolidation
Changing demand
• Value of livestock products and corn prices 1970 to 2007 in 1980 adjusted $s

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</tr>
</thead>
<tbody>
<tr>
<td>Milk ($/cwt)</td>
<td></td>
<td>14.49</td>
<td>15.84</td>
<td>10.51</td>
<td>7.29</td>
<td>5.3</td>
<td>7.63</td>
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<tr>
<td>Beef cattle ($/cwt)</td>
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<td>70.29</td>
<td>76.08</td>
<td>57.07</td>
<td>39.84</td>
<td>35.85</td>
<td>35.73</td>
<td>-49%</td>
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<tr>
<td>Hogs ($/cwt)</td>
<td></td>
<td>59.22</td>
<td>46.4</td>
<td>41.08</td>
<td>24.56</td>
<td>18.8</td>
<td>18.52</td>
<td>-69%</td>
</tr>
<tr>
<td>Lambs ($/cwt)</td>
<td></td>
<td>69.32</td>
<td>79.81</td>
<td>42.4</td>
<td>46.34</td>
<td>39.03</td>
<td>39.14</td>
<td>-44%</td>
</tr>
<tr>
<td>Broilers ($/lb)</td>
<td></td>
<td>35</td>
<td>35</td>
<td>25</td>
<td>20</td>
<td>17</td>
<td>15</td>
<td>-57%</td>
</tr>
<tr>
<td>Eggs ($/doz)</td>
<td></td>
<td>102</td>
<td>66</td>
<td>54</td>
<td>36</td>
<td>24</td>
<td>35</td>
<td>-66%</td>
</tr>
<tr>
<td>Corn (CPI-adjusted to 1980)</td>
<td>$0.65</td>
<td>$3.11</td>
<td>$3.73</td>
<td>$4.02</td>
<td>$7.77</td>
<td>$10.96</td>
<td>+1,596%</td>
<td></td>
</tr>
</tbody>
</table>
Consequences

- Value of animal is too low to justify incurring the expense of professional veterinary care
- Farms need cheap labor to survive
- As farms increase in size, farm staff take on additional responsibilities for animal care
- The poultry industry has training programs for farm staff, others sectors of the industry do not
- FA veterinarians and registered FA technicians should be trained to provide farm staff with instruction on animal health & welfare, farm hygiene, & food safety.
Poultry industry

• Industry produces 8.9 billion broilers, 250 million turkeys, and 90 billion eggs from 336 million laying hens

• There are 315 members of the American College of Poultry Veterinarians.

• Presently, there are reported to be no serious shortage of poultry veterinarians in the U.S. (Gilson & Hofacre, 2006)

• Veterinarians in poultry diagnostic labs are aging. Too few veterinarians are in training to replace them.

• There are unfilled positions for poultry veterinarians in the pharmaceutical industry
Training programs in the poultry industry

• For positions in the industry, veterinarians undergo ~2 years post DVM training on poultry husbandry, animal health & welfare, environmental management & food safety

• There are no comparable opportunities in other areas of FA veterinary medicine

• Flock supervisors deliver an important infrastructure of poultry health care & are provided with significant continuing education opportunities.
Between 1996 & 2005, approximately 85 new members joined the ACPV, 8.5 per year. Over 35 years this rate will provide a population of 300 poultry veterinarians. These numbers are inadequate to fill the need.
Swine Industry

During the ‘90s the swine industry transformed from one dominated by small operations that practiced farrow to finish farming to one dominated by large operations that specialize in a single phase of production. This has profoundly affected the veterinary profession.
Structural changes in the U.S. swine industry in the past 20 years
70% decline in # of operations

Operations (thousands)

Inventory (mil. head)

1 An operation is any place having one or more hogs on hand at any time during the year.

Source: USDA, ERS using data from USDA, NASS, January 2005.
Increase in size and efficiency of operations

Source, USDA, ERS
Regional changes in the swine industry, 1992 - 1997

Source, USDA ERS
Impact on membership of American Association of Swine Veterinarians, AASV

- 1995 AASV membership = 1,400
- 2008 AASV membership = 769, 45% decline
- 1993 Iowa AASV membership = 401
- 2004 Iowa AASV membership = 217, 46% decline
- Anecdotal evidence indicates the change resulted from the decline in *farrow to finish* operations and of mixed animal practitioners who served them
Entries are in 5 year blocks. Between 1996 & 2006, thirteen new members joined AASV per year. Over a 35 year career span this will support an AASV membership of 455 veterinarians, a 40% decline from 2008. This is not an adequate # to provide care for 60 million hogs & an increasingly specialized and productive industry. Data Source AASV
Consolidation of the dairy industry

# operations

# cows/farm

Source, USDA, ERS
The industry is moving west, this has significant workforce implications for bovine practice
FA exclusive veterinarians. The largest number are in dairy practice in the Eastern half of the U.S. They will be most affected by continuing industry consolidation.
Number of milk cows per veterinarian
Wisconsin & California, 2007

<table>
<thead>
<tr>
<th></th>
<th>AABP members</th>
<th>Milk cows</th>
<th>Dairies</th>
<th>Cows/dairy</th>
<th>Cows/vet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisconsin</td>
<td>234</td>
<td>1,252,000</td>
<td>13,603</td>
<td>92</td>
<td>5,359</td>
</tr>
<tr>
<td>California</td>
<td>112</td>
<td>1,336,480</td>
<td>2,324</td>
<td>602</td>
<td>11,932</td>
</tr>
</tbody>
</table>


# cows per veterinarian in CA are probably under-estimated as many AABP members in the State are involved in beef animal practice

With increasing size, farm staff take over more routine animal care. Fewer FA veterinarians are needed but have greater responsibilities for managerial decisions over the entire farming operation. This requires an in-depth, specialized understanding of the industry
Most graduates do not receive the comprehensive, specialized education needed to fulfill these responsibilities.

*Large dairies routinely use consultants for issues of housing, communications, employee training, nutrition, & environmental regulation, issues that are seen by producers as outside the realms of veterinary medicine* (Decision Strategies International 2016)

New serological pregnancy tests threaten demand for the traditional services of bovine practitioners.

Farm staff provide more and more primary animal health care. The veterinary profession must provide farm staff with education on animal health, farm hygiene, food safety, animal welfare, etc.
Recruitment to AABP 1975 to 2005

Entries are in 5 year blocks. Between 1975 & 1985, 706 veterinarians joined AABP. Between 1995 & 2005, 317 new members joined AABP, or 32/yr. Over a 35 year career span this level of recruitment will, at most, support an AABP membership of 1120 FA veterinarians. This is not an adequate # to provide specialized health care for 9 million dairy cows, 7 million heifers and 100 million beef cattle.
July 1 U.S. Cattle Inventory 1991-2011

Million Head

2011 Inventory 100,000,000
Small ruminants, especially goats are increasing in numbers.

Veterinarians need to play a greater role in small ruminant health & welfare, food safety, and research.

Source, USDA, ERS
Conclusions, & Recommendations, FA veterinary education

• The veterinary profession has a declining presence in the consolidated & increasingly specialized FA industries.

• Different sets of skills are required to meet the needs, elevate the profession & attract new graduates.

• FA veterinarians must provide leadership to address the obligations of the Food Safety Modernization Act

• A more demanding, comprehensive & integrated system of FA education is needed.
• No one school/college can provide the necessary breadth of specialized education.

• Schools & colleges should share resources and must_work_together to create portfolios of specialized, on-line courses and case studies on production medicine for each of the FA species.

• This will require a collaborative system to manage FA education by the schools/colleges.
• Centers of educational excellence are needed to provide high quality practical FA veterinary education. Students should pass relevant online courses prior to moving to a center of excellence.

• For each of the FA species there should be more than one center of educational excellence.

• Centers should be regional.
Veterinary services to rural America

• Veterinary services in rural America are fragile and are part of a more general problem of poverty & health care delivery in rural America.

• Needs for environmental surveillance and livestock health care delivery are rapidly increasing in rural America.

• Nurse practitioners have increased access and efficiency of health care delivery in human medicine and have an excellent history of meeting rural primary health care needs.

• The veterinary profession should follow this lead.
• Fragility of services to rural America will continue until the profession takes the lead and develops an integrated system of food animal health and welfare, food safety, and ecosystem health.

• Rural farmers need high quality veterinary consultation on production medicine.

• The profession should develop pilot programs to measure the efficacy of using rigorously trained and credentialed FA paraprofessionals working in health care teams with consultant FA veterinarians who are located distantly.
END
Changes in AVMA numbers, 1994 – 1995
Mixed FA set at 50% commitment to FA

<table>
<thead>
<tr>
<th></th>
<th>LAE</th>
<th>LAP</th>
<th>Total LA</th>
<th>SAE</th>
<th>SAP</th>
<th>Total SA</th>
<th>Mix FA</th>
<th>All</th>
<th>FA FTE</th>
<th>FA %</th>
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<tr>
<td>1994</td>
<td></td>
<td></td>
<td>4,289</td>
<td></td>
<td></td>
<td>25,493</td>
<td>13,988</td>
<td>59,360</td>
<td>11,283</td>
<td><strong>19.01</strong></td>
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<td>1995</td>
<td>1,805</td>
<td>4,078</td>
<td>5,883</td>
<td>22,839</td>
<td>5,376</td>
<td>28,215</td>
<td>3,148</td>
<td>54,852</td>
<td>6,641</td>
<td><strong>12.11</strong></td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>+1,594</td>
<td></td>
<td></td>
<td>+2,722</td>
<td>-10,840</td>
<td>-4,500</td>
<td>-4,642</td>
<td>-6.68</td>
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</tbody>
</table>

• Foreign members were excluded in 1995 ~ 4,500 members
• Due to new definition, 10,840 clinicians who did some FA work were excluded from mixed animal roster
• Some redistributed to LA (1,594) and SA (2,722)
• No accounting for 2,024 previous mixed animal practitioners
• Percentage FA, FTE workforce fell from **19.01** to **12.11%**
### Number of U.S. Veterinarians

<table>
<thead>
<tr>
<th>Year</th>
<th>LAE</th>
<th>LAP</th>
<th>Total LA</th>
<th>Small Animal</th>
<th>Mixed*</th>
<th>All (Private &amp; Public)</th>
<th>Total Food</th>
<th>% Overall</th>
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<tbody>
<tr>
<td>1966</td>
<td>1,881</td>
<td>1,881</td>
<td>4,700</td>
<td>7,917</td>
<td>26,632</td>
<td>5,820</td>
<td>21.85%</td>
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<tr>
<td>1971</td>
<td>1,700</td>
<td>1,700</td>
<td>7,050</td>
<td>8,583</td>
<td>25,665</td>
<td>5,992</td>
<td>23.35%</td>
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<tr>
<td>1976</td>
<td>1,958</td>
<td>1,958</td>
<td>9,524</td>
<td>9,437</td>
<td>27,889</td>
<td>6,677</td>
<td>23.94%</td>
<td></td>
</tr>
<tr>
<td>1981*</td>
<td>1,113</td>
<td>1,113</td>
<td>12,210</td>
<td>11,153</td>
<td>33,545</td>
<td>6,800</td>
<td>19.94%</td>
<td></td>
</tr>
<tr>
<td>1986</td>
<td>4,024</td>
<td>4,024</td>
<td>17,882</td>
<td>13,344</td>
<td>46,625</td>
<td>10,896</td>
<td>22.94%</td>
<td></td>
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<tr>
<td>1987</td>
<td>4,023</td>
<td>4,023</td>
<td>18,984</td>
<td>13,479</td>
<td>48,646</td>
<td>10,763</td>
<td>22.12%</td>
<td></td>
</tr>
<tr>
<td>1988</td>
<td>4,020</td>
<td>4,020</td>
<td>19,885</td>
<td>13,502</td>
<td>50,612</td>
<td>10,771</td>
<td>21.28%</td>
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<tr>
<td>1989</td>
<td>4,054</td>
<td>4,054</td>
<td>20,721</td>
<td>13,420</td>
<td>52,027</td>
<td>10,784</td>
<td>20.69%</td>
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<tr>
<td>1990</td>
<td>4,086</td>
<td>4,086</td>
<td>22,056</td>
<td>13,769</td>
<td>53,299</td>
<td>10,971</td>
<td>20.58%</td>
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<tr>
<td>1991</td>
<td>4,122</td>
<td>4,122</td>
<td>22,920</td>
<td>13,757</td>
<td>55,157</td>
<td>11,001</td>
<td>19.94%</td>
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</tr>
<tr>
<td>1992</td>
<td>4,243</td>
<td>4,243</td>
<td>23,967</td>
<td>13,944</td>
<td>56,421</td>
<td>11,215</td>
<td>19.88%</td>
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<tr>
<td>1993</td>
<td>4,280</td>
<td>4,280</td>
<td>24,682</td>
<td>14,047</td>
<td>58,099</td>
<td>11,304</td>
<td>19.46%</td>
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<td>1994</td>
<td>4,289</td>
<td>4,289</td>
<td>25,493</td>
<td>13,888</td>
<td>59,360</td>
<td>11,283</td>
<td>19.01%</td>
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<td>1995</td>
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<td>3,148</td>
<td>54,852</td>
<td>6,641</td>
<td>12.11%</td>
<td></td>
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<tr>
<td>1996</td>
<td>1,857</td>
<td>4,078</td>
<td>5,935</td>
<td>3,215</td>
<td>55,252</td>
<td>6,727</td>
<td>12.17%</td>
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<tr>
<td>1997</td>
<td>1,860</td>
<td>4,024</td>
<td>5,884</td>
<td>3,207</td>
<td>56,694</td>
<td>6,683</td>
<td>11.79%</td>
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<tr>
<td>1998</td>
<td>1,771</td>
<td>3,802</td>
<td>5,573</td>
<td>3,097</td>
<td>57,052</td>
<td>6,361</td>
<td>11.15%</td>
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</tr>
<tr>
<td>1999</td>
<td>1,894</td>
<td>3,876</td>
<td>5,770</td>
<td>3,418</td>
<td>60,829</td>
<td>6,704</td>
<td>11.02%</td>
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</tr>
<tr>
<td>2001</td>
<td>2,195</td>
<td>3,583</td>
<td>5,778</td>
<td>3,909</td>
<td>72,423</td>
<td>7,016</td>
<td>9.66%</td>
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<tr>
<td>2002*</td>
<td>2,142</td>
<td>3,013</td>
<td>5,154</td>
<td>3,666</td>
<td>72,598</td>
<td>6,385</td>
<td>8.80%</td>
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<tr>
<td>2003</td>
<td>2,253</td>
<td>3,273</td>
<td>5,526</td>
<td>3,882</td>
<td>76,026</td>
<td>6,812</td>
<td>8.96%</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td>2,285</td>
<td>3,145</td>
<td>5,430</td>
<td>3,880</td>
<td>77,889</td>
<td>6,748</td>
<td>8.66%</td>
<td></td>
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<tr>
<td>2005</td>
<td>2,268</td>
<td>3,047</td>
<td>5,315</td>
<td>3,900</td>
<td>79,569</td>
<td>6,656</td>
<td>8.36%</td>
<td></td>
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<tr>
<td>2006*</td>
<td>993</td>
<td>4,150</td>
<td>5,143</td>
<td>4,376</td>
<td>84,946</td>
<td>6,501</td>
<td>7.65%</td>
<td></td>
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<tr>
<td>2007*</td>
<td>1,048</td>
<td>4,042</td>
<td>5,080</td>
<td>4,345</td>
<td>87,946</td>
<td>6,454</td>
<td>7.34%</td>
<td></td>
</tr>
</tbody>
</table>

* Data includes the number of veterinarians working in the agricultural industry.
Between 1966 & 2007, FA, FTEs increased from 5,820 to 6,454 or by 11%. These published results are hard to correlate with present evidence of weakness of FA services in rural America.