

## **Chapter 22**

### **Discussion and Recommendations**

Scholars in veterinary medicine have paid little attention to the managerial issues of supply and demand in food animal medicine despite the immense importance of these topics to the profession. Ignoring or misreading trends that affect a major component of the veterinary profession and the food supply chain places both at risk. Relying on anecdotal stories and examples to guide strategic action is dangerous. Systematic evidence based on sound science is the best guide for improving the profession and how it serves society. Substantial market segments exist in the food supply chain with needs that are not being fully met by existing services in the veterinary profession. Unfounded negative information about food animal medicine will damage the needed supply of students into the profession and cause practicing veterinarians to forego significant business opportunities. Both the veterinary profession and society will be worse off if this occurs.

This research program provides the first comprehensive overview of critical business management issues in food animal medicine which we believe will dramatically enhance the future of veterinarians for several decades to come. The goal of this research is to provide answers to the following questions:

1. What is the future demand for food supply veterinarians in industry, government, academia, and practice and the key issues driving future demand?
2. Will there be a future surplus or shortage of food supply veterinarians and what are the key issues that determine the extent that the supply of labor will not match the needed demand for services?
3. What attracts students to food animal careers in veterinary medicine?

4. What are student expectations for a career in food supply veterinary medicine and the factors that affect their employment selection?
5. What motivates some students to change their career focus to a different area of veterinary medicine while in school and what drives their commitment to food supply veterinary medicine?
6. For practicing food supply veterinarians, what is their level of employment satisfaction and career commitment and what are the factors that influence their intention to continue or change their career area?

The answers to these questions provide an informed basis to identify strategies that Colleges of Veterinary Medicine, industry, government, practitioners, and professional veterinary associations can implement to better take advantage of opportunities that exist and counter the threats that challenge the food supply veterinary profession. This will make a good profession better and enable it to address the important societal issues of food safety, animal health, and public health. The issues addressed by this research program are viewed from a variety of perspectives including those of students, Deans, faculty, recruiters, and veterinarians employed in industry, practice, government, and academia. Throughout much of the research we take the perspective of the “voice of the customer” and what drives his or her decision making process.

In this section, we offer a review of our findings and a strategy for each major conclusion. The conclusions reported in this section are based upon a program of research studies that included thirteen Delphi forecasting panels, seven focus groups and ten large scale surveys in the USA and Canada. This chapter is meant to be a broad brush at the overall findings coming out of this research program. More detailed findings can be found in the chapters that report on the individual studies. The knowledge base created by this research program will help

leaders formulate long-range plans and take strategic action that will improve the veterinary profession and reposition it to take full advantage of emerging opportunities over the next twenty years.

## **Future Demand & Shortages of Food Supply Veterinarians**

The food supply veterinarian is not an endangered species! In spite of many societal changes, such as urbanization and dramatic food industry changes, notably consolidation of the food supply system and larger sized producer operations that has affected the way food supply industries operate in the US and Canada, there will be increasing demand for food supply veterinarians. The results of the 13 Delphi forecasting panels, each focused on key sectors of the food supply veterinary medicine profession, document that while demand varies significantly in different areas, there is a strong case for increasing demand. The Poultry area is one sector where demand increases will be quite modest, but even in this segment very few panel experts foresee decreasing demand. Other areas, such as the government sectors, will continue to face significant increasing demand that is well into the double-digit growth over the 2004 to 2016 forecast period.

For several Delphi panels, such as those focused on the mixed food animal, beef cattle, and dairy sectors, there is sharp disagreement among experts on what future demand will look like. Often Delphi panels, over the sequence of three separate forecasts, reach more of a consensus on what future demand is likely to be. In some panels, however, those experts that were either initially pessimistic or initially optimistic about future demand continued to hold their positions and tacitly agreed to disagree. Analyzing their competing rationales proved quite informative and underscored that the actual demand changes the food supply field will see in the future is very much a function of the strategic actions pursued by the FSVM profession in the

near-term. Strategic actions can be taken that will result in veterinarians being better prepared to provide high value-adding services in the changing context of industry consolidation and larger producer operations. This will result in stronger increasing demand.

The summary picture of future demand is presented in Table 1. In that table, each data for each panel is presented in order of the *aggregated* demand forecast over all three time periods (2004-2007, 2007-2010, and 2010-2016). A One-Way ANOVA test verified that there are significant differences ( $p < .001$ ) between the panel means. The Poultry sector is likely to see the smallest increase in future demand. Data for this panel is presented on the top data row of Table 1. Cumulative growth of around +4.0% and within the +2.0% to +8.0% range identified by those between the 25<sup>th</sup> and 75<sup>th</sup> percentiles (the middle 50% of the distribution) over a 12 year period is quite modest.

The other five practice areas have mean forecasts that are numerically higher (but not statistically different). These are presented on the next five rows of data. The aggregate demand for the mixed food animal sector, with a mean of 10.70 is not significantly different than the sectors with the highest means. The academic and the industrial-pharmaceutical sectors are next in order of forecasted demand. The various point estimates (means and medians) place demand between +11.5% and +13.0% in aggregate growth. The five government panels have the highest means and medians of all panels. This ranges from a mean of 15.44% for the panel focused on the Canadian Federal Government sector to 20.80% for the panel focused on the State and Provincial Government sector over the 12 year forecast period. It should be noted that all panels made forecasts that assume a continuation of emerging trends shaping demand and no intervening catastrophic events. This makes these forecasts conservative in nature. Significant disease, food related public health, and agro-terrorism events will likely shift demand dramatically higher.

Table 1. Aggregated Demand Increases Over All Three Time Periods (2004-16)					
Delphi Panel Sector	Mean %	Median %	Mid-50%	SD	N
Poultry	+4.11 <sup>a</sup>	+4.0	+2.0 to +8.0	4.27	19
Small Ruminants	+7.54 <sup>a,b</sup>	+7.0	+4.0 to +11.0	5.04	13
Beef Cattle	+7.70 <sup>a,b</sup>	+9.5	-2.5 to +14.3	12.00	20
Dairy	+8.29 <sup>a,b</sup>	+14.0	-5.0 to +17.5	13.84	21
Swine	+9.96 <sup>a,b</sup>	+14.0	+4.3 to +16.5	12.91	22
Mixed Animal	+10.70 <sup>a,b,c</sup>	+14.5	-4.0 to +23.0	17.25	20
Academe	+12.58 <sup>a,b,c</sup>	+13.0	+9.0 to +18.0	10.45	19
Industrial - Pharmaceutical	+12.83 <sup>a,b,c</sup>	+11.5	+6.3 to +20.3	8.53	12
Federal – Canada	+15.44 <sup>b,c</sup>	+16.0	+10.5 to +20.0	6.02	9
Federal – Animal Health	+16.29 <sup>b,c</sup>	+15.0	+9.5 to +21.8	8.58	14
Federal – Public Health	+16.75 <sup>b,c</sup>	+16.0	+10.3 to +20.5	14.49	12
Federal – Food Safety & Security	+17.46 <sup>b,c</sup>	+22.0	+10.0 to +26.0	12.76	13
State/Provincial Government	+20.80 <sup>c</sup>	+19.0	+13.0 to +27.0	15.58	35
Panels Combined	+12.46	+13.0	+6.0 to +20.5	13.05	229
<p>1. The “Mean %” and “Median %” are cumulative or aggregated average percentage demand increases over all three time periods for each panel. The “Mid-50%” is the interquartile range (middle 50% of estimates) of the demand change estimates. “SD” is the Standard Deviation and “N” is the panel sample size.</p> <p>2. There is an overall significant difference (<math>p &lt; .001</math>) between panel means (using a One-Way ANOVA test). The Duncan’s post-hoc multiple range test was used to identify significant differences between panel means. A common superscripted letter (<sup>a,b,c</sup>) identifies homogeneous sub-groups where there are no significant differences. Panel means without a common superscripted letter are significantly different from one another. For example, the Poultry mean (+4.11<sup>a</sup>) is significantly lower than all five government panels (with means ranging from +15.44<sup>b,c</sup> to +20.80<sup>c</sup>) but is not significantly different from the Small Ruminants mean (+7.54<sup>a,b</sup>).</p>					

While several panels had less variance around the mean estimates (noted by smaller standard deviations and narrower interquartile ranges) indicating higher levels of consensus, there are several panels with high levels of disagreement. Analyses reported in the individual chapters, which contrasted those projecting relatively higher versus lower demand changes, identified differing assumptions as the primary explanation of those differing forecasts. In particular, differing responses to consolidation and the growth in the size and scale of producer operations was a key factor. In the Beef, Dairy, Swine, and Mixed Animal sectors, some expert panel members see opportunities for veterinarians to provide new value-adding services to these large producer concerns. They also see these opportunities as far outweighing the losses in demand for traditional diseased animal care services that these industry changes have created. Given those views, this optimistic sub-group forecasted much higher increases in demand than the means reported in Table 1. Those seeing the growth in the size of producer operations as leading to demand decreases tended to make significantly lower forecasts. These diverging assumptions engendered wide-ranging forecasts. For example, the middle 50% (interquartile range) projected demand changes between -2.5% (a decrease) to +14.3% (an increase) in the Beef Cattle sector. Similar wide ranges are apparent in the Dairy and Mixed Animal sectors.

The bigger story from the 13 panel Delphi study findings is not about future demand, but rather about future supply and the likelihood of shortages of food supply veterinarians. Across many panels, there was a pattern of moderate increasing demand coupled with forecasts of labor shortages that are notably higher. Table 2 presents the data for the *average* shortages forecasted across all three time periods.

Delphi Panel Sector	Mean %	Median %	Mid-50%	SD	N
Poultry	-0.06 <sup>a</sup>	0.0	0.0 to -.8	1.03	19
Small Ruminants	-2.23 <sup>a,b</sup>	-2.2	-1.0 to -3.6	1.40	13
Industrial - Pharmaceutical	-3.30 <sup>b,c</sup>	-2.8	-.8 to -5.1	3.78	12
Dairy	-3.80 <sup>b,c,d</sup>	-3.5	-1.6 to -5.4	3.24	21
Swine	-4.42 <sup>b,c,d</sup>	-4.0	-2.7 to -6.3	2.74	21
State/Provincial Government	-4.85 <sup>b,c,d</sup>	-4.3	-1.8 to -6.6	4.79	36
Federal – Public Health	-5.24 <sup>b,c,d</sup>	-4.9	-3.0 to -8.6	3.78	12
Beef Cattle	-5.40 <sup>b,c,d</sup>	-4.6	-2.2 to -6.5	5.46	20
Federal – Canada	-5.45 <sup>b,c,d</sup>	-4.6	-3.3 to -7.1	3.64	10
Academe	-5.46 <sup>b,c,d</sup>	-5.0	-3.0 to -7.3	4.00	19
Federal – Food Safety & Security	-6.57 <sup>b,c,d</sup>	-5.3	-3.8 to -8.6	6.01	14
Mixed Food Animal	-6.60 <sup>c,d</sup>	-5.8	-2.9 to -9.8	5.00	20
Federal – Animal Health	-6.86 <sup>d</sup>	-5.6	-2.5 to -9.9	5.16	14
Panels Combined	-4.61	-4.0	-1.7 to -6.3	4.43	231

1. The “Mean %” and “Median %” is the percentage shortage (or surplus) averaged over all three time periods for each panel. The “Mid-50%” is the interquartile range (middle 50% of estimates). “SD” is the Standard Deviation and “N” is the panel sample size. Negative numbers (-) indicate shortages.
2. There is an overall significant difference ( $p < .001$ ) between panel means (using a One-Way ANOVA test). The Duncan’s post-hoc multiple range test was used to identify significant differences between panel means. A common superscripted letter (<sup>a,b,c</sup>) identifies homogeneous sub-groups where there are no significant differences. Panel means without a common superscripted letter are significantly different from one another. For example, the Poultry mean (-0.06<sup>a</sup>) is significantly lower than the Dairy mean (-3.80<sup>b,c,d</sup>) but is not significantly different from the Small Ruminants mean (-2.23<sup>a,b</sup>).

Table 2 presents the data for each panel in order of forecasted shortages. Statistical analysis (One-Way ANOVA) found significant differences between the mean shortages forecasted in these 13 panels. Chapters 2 through 11 report the details of the short-term (2004-07), medium-term (2007-10), and long-term (2010-16) forecasts. Table 2 reports the average forecast data over those three periods. Once again, the Poultry sector data is presented on the first row of data since it has the lowest shortage forecast and all other panels foresee higher shortages. Both practice areas and government sectors are likely to see persistent future shortages of food supply veterinarians that present significant challenges for the FSVM profession. With the possible exceptions of Poultry, Small Ruminants, and the Industrial-Pharmaceutical sectors, every sector faces significant shortages that have the potential for serious consequences.

The story behind the consistent picture of shortages over most sectors is that unless strategic actions are taken soon, the numbers of DVMs entering food supply careers will not replace those who are expected to leave their food supply career roles due to career changes, including retirements. In this scenario, even modest increases in demand raises serious questions about whether the veterinary profession can deliver on its obligations to society. Strategic action is needed to address these supply problems. Gaps between supply and demand leave both the profession and society vulnerable to shocks that will come in animal disease or bio-terrorism/agro-terrorism threats. Food safety, public health, and economic well-being will be vulnerable unless these challenges are addressed. Expanding opportunities for FSVM professionals may also aggravate shortages.

Colleges of Veterinary Medicine need to be a central focus in any resulting strategic action. Many panels raised concerns about the tendency of veterinary medical colleges to select students unlikely to be attracted into a food supply career. There were additional concerns about

the training students receive in school and the negative signals about food supply careers given to students. Aside from foreign-trained veterinarians coming to the US and Canada, the supply of veterinarians needed to fill the FSVM labor needed in most sectors must come from the 32 Colleges of Veterinary Medicine in the US and Canada. Shortages of resources for these colleges, including inadequate numbers of academic food supply veterinarians (estimated to be over a 5.0% average shortage over the 12-year forecast period) in colleges will exacerbate the labor shortages projected in many other sectors. Unless problems in the academic sector are addressed, the shortage projected for most other sectors will persist and the many areas facing shortages will be left to battle each other for the too few FSVM focused new graduates in a zero-sum game where there is a loser for each winner. No sector can really win the larger battle over the long run. Society and our national economic well-being will end up being the unequivocal loser if these problems are unsolved and the projected pattern of shortages will continue.

While Colleges of Veterinary Medicine need to review and reconsider their own recruitment and selection practices and internal resource allocation policies, the problem of shortages may need external resources, including both industry and government sponsorship. Mentoring initiatives that support the career needs of students committed to a FSVM track and provide bridges between their college experience and the start of their career after graduation should be a part of any larger strategy for countering the projected shortage trends. We should not just look at veterinary colleges individually. A look at the larger system of training veterinarians suggests that we need to learn some lessons from the food supply industries that veterinarians serve. Coordination and consolidation of effort across schools, with solutions that include Centers of Excellence and better economies of scale in key food supply veterinary medicine sectors, will be needed to solve the challenges of selecting and training adequate

numbers of food supply veterinarians for the future. While each sector had significantly different ratings of many of the 18 different solutions to shortages rated by all panels, the number one solution for addressing the shortage problem involves creating mechanisms for addressing student debt. This will help both the attraction and retention processes needed to sustain a healthy supply of FSVM professionals.

The results of the rating of all 18 solutions included in the final survey of all 13 panels are summarized as follows:

1. Student debt repayment and scholarship programs for service in areas of need (mean of 5.26 on a 7-point scale)<sup>1</sup>
2. More involvement of food supply practitioners in training veterinary students (mean of 4.78)
3. Mentoring initiatives for students and those starting a food supply career (mean of 4.62)
4. Appointment of more food supply faculty at colleges of veterinary medicine (mean of 4.56)
5. Expanded postgraduate fellowships in food supply areas (mean of 4.56)
6. A paid externship requirement in food supply medicine during the summer (mean of 4.42)
7. Expand the Centers of Excellence concept with a nationally recognized focus on different food supply sectors (mean of 4.40)
8. Marketing campaigns to increase awareness of food supply career and lifestyle opportunities (mean of 4.39)
9. Expanded paid work-study programs during the final year of the DVM programs (mean of 4.38)
10. Provide expanded job placement services in the food supply veterinary medicine areas (mean of 4.36)

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<sup>1</sup> Panel members rated the extent that each possible solution will lead to an *elimination* of a shortage of veterinarians. This high standard should be noted in interpreting the meaning of the mean rating. The following rating scale was used: 1. Not at all Effective, 3. Slightly Effective, 5, Effective, 7. Highly Effective.

11. Focused recruitment of high school and college students with food supply interests into veterinary colleges (mean of 4.31)
12. Reserve class slots for academically qualified students with food supply interests and relevant background (mean of 4.29)
13. Increased focus of food supply coverage early in the DVM curriculum (mean of 4.25)
14. Development of a government-supported Reserve Corps of food supply DVMs for disease surveillance and control activities (mean of 3.78)
15. Expanded business and practice management coverage in DVM curriculum (mean of 3.67)
16. Focused recruitment of women students into food supply areas (mean of 3.40)
17. Development and dissemination of Business Best Practices guidance for food supply veterinary enterprises (mean of 3.37)
18. Subsidized consulting in business and practice management for new food supply DVMs (mean of 3.21)

A clear premise of this research is the future that we will live in tomorrow is created by the collective actions we take today. While there are larger trends (such as urbanization and industry consolidation) that will not be changed and must be adjusted to and managed around, the future is not a deterministic function of unchangeable larger social and economic forces. It is very much created by our choices. Many of the trends and issues shaping the future of the food supply veterinary profession are created by choices within the profession. These can be thoughtfully reviewed and revised. Strategic actions implemented in the near-term can change the trends that will otherwise continue to shape a future that is not good for academic food supply veterinarians or society. We should expect that the unplanned or localized responses to shortages will add up to a sub-optimal solution. Unnecessary negative economic impacts and challenges to societal well-being is the natural consequence to non-strategic responses. The

veterinary profession can do better! Fulfilling its Oath and responsibilities to society requires immediate strategic action to counter these trends.

The shortages of food supply veterinarians forecasted for many sectors are conservative estimates. The point estimates and range of shortages noted by the middle 50% of panel experts are based on the assumption that no major disease, agro-terrorism, or other severe or catastrophic events will occur. It is one thing to hope for such luck; it is another thing to plan for this rosy scenario! History tells us the FSVM profession must step up and be prepared to counter such events.

The planning matrix and supporting analyses provide in chapters 2 through 11 for each of the 13 FSVM sectors provides guidance on the *opportunities* and *constraints* that must be considered in planning future action. This is, however, only a starting point. The profession, both collectively and in each sector, must address where its *strengths* and *weaknesses* are in moving beyond this starting point. Thoughtful leaders in the larger profession need to identify where they have the best advantage to guide effective collective action. All professions have strengths and weaknesses; effective leaders understand how to leverage their strengths while being mindful of their weaknesses. The listing of 18 solutions identified in the previous section provide a starting point for developing effective elements of an effective coherent strategy of collective action, which will change the profession and enable it better fill its obligations to society.

The remainder of this chapter discusses the typical profile of students interested in food animal medicine, food animal medicine career expectations, tactics for encouraging students to consider food animal medicine, career focus area switching among students and practicing veterinarians, and the factors influencing a lifetime commitment to food animal medicine.

# **Background of Students Attracted to a Career in Food Animal Medicine**

## **Demographic Factors**

The profession was studied to create a profile of the students and applicants most likely to concentrate in food supply medicine while attending a College of Veterinary Medicine. Two groups of veterinarians that included those who were employed a few years versus those who had worked for a long time in the profession were asked where they spent their childhood. An examination was also made of the decision factors that influenced students' decisions to select a career in food supply medicine versus other options. These studies suggest that there are several demographic and experiential antecedents that occur during childhood that influence one's decision to select a career in food animal medicine and stay committed to it. Young people interested in this area display a certain set of attitudes that influence their decision to commit to a career in food animal medicine.

In terms of demographic factors, where a person spent their childhood and where they desire to live and work after graduation have an influence on the specific concentration area selected by students in veterinary college and also influences the concentration area they are employed in after graduation. The majority of first year students and applicants that planned to concentrate in food animal medicine grew up on a farm or ranch or in a community with under 10,000 people. First year students that tend to focus on companion animals, equine or areas other than food animal medicine typically grew up in the suburbs of large cities or in communities with 50,000 or more people.

Deans and food animal faculty have a similar belief that a rural background also has a strong influence on selecting a food animal career. Academicians think that their food animal graduates have a desire to return to live and work in the country. The perceptions of Deans and faculty were closely aligned with early (5 years or fewer out of school) and later (6 or more years out of school) career food animal veterinarians. Early career food animal veterinarians tend to be married, currently live in a small town, and express the desire to live on a farm or ranch. The majority of veterinarians that had worked six or more years spent their childhood on a farm, ranch, or in a suburban area, currently live in a city and want to live on a farm or ranch in the future. Thus, a rural upbringing and a strong desire to return to a life in the country are strongly associated with concentrating in food animal medicine while in the early years of veterinary college and in the early and later years after graduation. Practicing veterinarians and first year students' desire for rural living, however, is different from the fourth year students in Colleges of Veterinary Medicine who report they want to live in more densely populated areas.

Additional important demographic variables related to occupational area choice in veterinary medicine were identified. These include gender and undergraduate major. Study results indicate that males are more likely to select a career in food supply veterinary medicine. Students that concentrate in food animal medicine disproportionately major in undergraduate areas of study that are in agriculture and the biological sciences.

Majoring in these areas during their undergraduate studies allows students to prepare for the curriculum in a College of Veterinary Medicine and to focus on animals, which are their primary interest. Students majoring in agriculture and the biological sciences are also likely to find kindred spirits in other students and are attracted to people with similar backgrounds and interests in food animals. This same phenomenon may continue in a person's career in that

people employed in food animal medicine may have a greater affinity for other people in the same occupational area of the veterinary profession. Indeed, many focus group respondents report that they enjoy being around and interacting with the types of people found in animal production careers. Undoubtedly, professional associations such as the American Association of Bovine Practitioners and the American Association of Swine Veterinarians bring people together at conferences and websites that share many of the same intellectual interests and lifestyle patterns. This will serve to keep people committed to the professional area once a career selection decision is made and a person is employed.

## **Childhood and Veterinary School Experiences**

Several childhood experiences predispose people to concentrate on food animal medicine when they attend a College of Veterinary Medicine. Students interested in food animal medicine as a career had a significant exposure to herd/flock animals in 4H and were more likely to have worked for a food animal veterinarian during their youth. Students reported that the food production veterinarian they worked for was a good role model. This finding obviously points to the powerful effect of a good mentor when students consider a career in veterinary medicine. These mentors are in a position to give young people the experiences with animals that ultimately have a profound influence on their career choice to become a veterinarian and the specific area of focus selected within that career.

Continual learning in the later years of veterinary school influences older students to select a career in food production medicine. Many third and fourth year veterinary food animal students reported having an externship that further solidified their choice of a career in food animal medicine. This suggests that experiences with animals before and during veterinary school further socialize people in an occupational area and points to the need to provide

production animal learning opportunities beginning in high school and continuing through veterinary college.

## **Career Attitudes**

Once students become attracted to food supply veterinary medicine as a career, there is a low likelihood of changing occupational areas in the profession. Students become quite committed to food animal medicine once they finalize their choice. Students that choose the life of a food animal veterinarian report higher levels of satisfaction with their career choice and express a higher level of commitment to that decision than those planning to enter other areas of the veterinary profession such as companion animal medicine. Underpinning this decision is the fact that food animal students develop a production orientation mentality in which they believe they are making a major contribution to maintaining a safe and wholesome food supply for the USA and Canada and enjoy the opportunity to help food producers make a profit. Improving the health of herds and flocks, and treating large groups of animals are seen by those food animal focused students as a superior career and lifestyle when compared to treating animals one at a time as in companion animal medicine.

Our findings indicate that students that decide to go into a food animal career are less concerned with the material things in life and place a high priority on relationships with other people. Potential clientele are viewed as nice, interesting people that will form the basis of a community of lasting friendships. Respondents frequently mentioned that one of the major advantages of working in food animal medicine was associating with the friendly people from rural areas versus dealing with the type of client typical in an urban environment. Salary is of less importance, perhaps because of a lower cost of living in rural areas and the perceived ability to create a quality lifestyle by living in the country. First year veterinary students think that food

animal veterinarians will earn from \$60,000 to \$80,000 after five years in the workforce. As students move through Colleges of Veterinary Medicine, they tend to slightly increase their salary expectations and males develop higher salary expectations than females.

## **Summary of Students Attracted to a Career in Food Animal Medicine**

The findings in this section indicate that students planning to work in food supply medicine have a distinctive background and outlook. They have high levels of food animal experience, a rural background, and initially want to live in areas when they graduate that are similar to what they experienced during childhood. They have a production animal orientation that includes thinking of companion animal medicine as being less prestigious than food supply medicine, they want to make valuable contributions to the nation's food supply, and help producers make a profit. They tend to be married men that are unconcerned with the physical aspects of dealing with herds/flocks of animals, and value relationships with other people over material objects. Students desire greater exposure to food animal cases early in their veterinary education, and a strong mentorship program.

Based upon the findings in this section of our study, we make the following recommendations to increase the supply of food animal students:

R<sub>1</sub>: Colleges of Veterinary Medicine should target students from rural areas that have had a significant food production experience.

R<sub>2</sub>: Colleges of Veterinary Medicine should target students that major in the biological sciences and agricultural areas during their undergraduate career.

R<sub>3</sub>: Students that concentrate in food animal medicine should participate in a paid summer externship in practice, industry, or the government sector.

R<sub>4</sub>: Professional veterinary medical associations should enact formal mentoring programs among their membership aimed at high school students.

## **Career Expectations of Students Attracted to Positions in Food**

### **Animal Medicine**

Both the positive and negative aspects of a career in food animal medicine were studied to understand the value individuals perceive they receive when they select a career in food animal medicine. People selecting a career in food animal medicine will base their decisions on the benefits they think they will receive from this occupational area. An underlying premise of this research program is that potential food supply veterinarians have different expectations and career needs, and thus the profession should treat them differently. The discussion of the conclusions in this section focuses on the employment expectations of students, the challenges and benefits of a career in food animal medicine, and important decision factors for selecting a career in this area. The perspectives of academicians, recruiters, and practitioners on these constructs are incorporated into this discussion.

### **Student Career Expectations**

Students express clear expectations about a career in food animal medicine and are generally very positive about this career field. Student respondents perceive food animal veterinary careers to be highly satisfying, stable careers that are associated with many interesting intellectual challenges, and a good annual salary. Students believe they will experience a high degree of interaction with others and a lot of freedom from close supervision while at work. The opportunity for autonomy in making decisions and working with rural people that are viewed as friendly are viewed as very desirable attributes of a career in food animal medicine. A food

animal veterinarian in a rural area is viewed by students as having the opportunity to have a meaningful life and be a community leader. Working outdoors with animals in a rural setting and being able to make independent decisions about animal health care are important to those students who select a food animal career. Deans and food animal faculty concur with these student perceptions and think that the life of a production medicine veterinarian is characterized by many benefits. Food animal academicians and Deans think these include a high annual salary, intellectual challenge, the opportunity to work with interesting people, and a quality rural lifestyle.

Time management concerns weigh less as a career expectation on first year food animal students when selecting an occupational area in veterinary medicine. Working nights and weekends, on-call hours, and a lack of flexible hours are not as important to food animal students. Most students seem to have a realistic preview of the lifestyle and time management issues that are thought to exist in food animal medicine. This parallels our findings among practitioners where there were no statistically significant differences between food and companion animal veterinarians in terms of concerns about balancing work and family or getting time off for vacations. When selecting a career in food animal medicine, students know what time management issues to expect when performing the job and, therefore, are not unpleasantly surprised by unrealistic performance expectations. This conclusion builds on an earlier finding that many people who select this occupational area have experience with herd/flock animals and rural living.

Students that select a career in food supply veterinary medicine are more likely to perceive food animal veterinary careers as flexible and not involving a great deal of dirty work compared to perceptions of non-food animal students. Third and fourth year food animal

students expect to work 60 or more hours per week. Since individuals that select a career in this area have childhood experiences with animals they may be comfortable with the working conditions found with production animals and not find the work to be unclean to the extent that someone would with little experience with food animals. This finding is further supported among practitioners who claim they do not mind getting dirty at work and do not find the job too physically demanding. Paradoxically, third and fourth year food animal students do report being somewhat intimidated by the size of large animals but are unconcerned about being injured or the physical demands of this type of work.

Students that concentrate in production medicine expect that this area will not require a lot of burdensome travel. Living in a rural area often requires traveling long distances to shop, visit a physician, or attend school that many from an urban area might consider to be tiresome and difficult. Traveling long distances, however, may be seen as a normal activity for those who were raised in rural areas. People with a rural background may not view travel to treat animals as burdensome or unnecessarily long in terms of distance perceptions because they were raised in an environment where travel was often required. Several respondents told us they liked being outdoors and enjoyed the scenery of a rural environment. The time spent traveling in a rural area between visits to clients was seen as a relaxing time versus treating a string of successive cases in a companion animal practice which was viewed as stressful.

## **Academician and Recruiters' Views of Career Expectations**

A principal components analysis of what Deans and faculty believe influences student employment selection offers another viewpoint about student career expectations in food animal medicine. Student employment selection decisions were seen as being heavily influenced by having a lot of free time from work coupled with an intellectually challenging career that

allowed students to fully utilize their medical skills. Students with a well-developed production animal orientation who can deal with the physical demands of working with large animals are perceived by academicians to be more likely to be attracted to this type of work and have realistic expectations about food animal medicine.

Recruiters of students were asked to identify factors that were important to applicants when selecting a job. The applicants told recruiters that a high salary and good job benefits were the most important factors affecting their decision to accept an offer. Applicants also wanted a supportive work environment once they were hired.

## **Practitioner's Views of Food Supply Careers**

We explored what veterinarians working for five or fewer years had to say about their current jobs in food animal medicine and the employment challenges they face. Evidence from this line of inquiry speaks to the high levels of job satisfaction and perceived benefits among those actually in the workforce. It was assumed that if food animal veterinary medicine was a poor career choice that had few benefits, it would become painfully evident among our surveys of practicing veterinarians. On the contrary, our study found a great deal of empirical support for the argument that food animal medicine is a very positive career and lifestyle. There is a high degree of job satisfaction among early career veterinarians who are proud and enthusiastic about working in a food animal position.

In terms of lifestyle issues, food animal veterinarians in this particular segment state they are not frustrated by a lack of restaurants, cultural or recreational activities and that there is good quality, affordable housing near work. A possible reason for this attitude about the lifestyle associated with food supply medical work is that people in this occupational area like rural living and are not that interested in the types of cultural activities that larger urban areas offer their

colleagues. People in rural areas find other ways to satisfy their needs for entertainment that are more centered and adapted to living in the country. One source of particular satisfaction is the clients that food animal veterinarians work with in the supply chain and the good relationships they enjoy with veterinary colleagues.

Many aspects of the nature of the work in the food production area are appealing to early career veterinarians. Good incomes coupled with an adequate client base in a job they do not find too demanding suggest other sources of job satisfaction in this segment. It is also possible that many early career food animal veterinarians live in low cost rural areas which enhances their cash flow and further adds to their job contentment.

## **Summary of Career Expectations**

Our findings indicate that students and practicing veterinarians believe that food animal careers are highly satisfying and are associated with the practice of intellectually challenging medicine and a good annual salary. These groups see many lifestyle advantages to a career in food animal medicine, including working with interesting people, and living in the country with a low crime rate and small population density. Time management issues and physical demands of the job as well as traveling long distances to treat animals are not major concerns of those interested in food animal medicine. Among practitioners we found strong support for the fact that food animal medicine is a positive career and lifestyle. Thus, we recommend:

R<sub>5</sub>: Students that display an interest in food animal medicine need to be told about the positive aspects of the career and lifestyle of food animal medicine in a variety of promotional materials.

R<sub>6</sub>: The career satisfaction results of this study should be broadly publicized to ensure that faculty, students, and other constituents that may influence a student's career choice are informed of actual job perceptions.

## **Encouraging Students to Enter a Career in Food Animal Medicine**

Next, our research identified actions that should be considered by those in managerial roles in the veterinary profession when creating strategies to attract students to careers in food animal medicine. Students at different stages of their veterinary education were asked what could be done to encourage more people to enter food animal veterinary careers. In this component of our research program we wanted to know how Colleges of Veterinary Medicine were fulfilling the needs of students and what could be done to create a superior learning experience for them. We were also interested in the relative importance that students place on the experiences they encounter during their medical education that encourage people to enter a food production medicine career.

## **Student Views on Encouraging Food Animal Careers**

The top three suggestions by first year students were financial in nature with the next three suggestions involving mentoring activities. First year students, in general, thought that offering eight week paid summer externships, paying student loans in exchange for working in food animal medicine, and providing financial assistance to buy equipment to start a food animal practice were the three most effective strategies for encouraging more people to enter this area of the veterinary profession. Mentoring strategies included the creation of a mentoring/shadowing program for high school students, providing job placement services, and providing faculty mentors for those interested in a food animal career. Students in the early stage of their veterinary education want financial assistance to fund their education and a lot of guidance from

faculty that are willing to spend the time to help students develop competencies and launch into a career in food animal medicine.

Third and fourth year students were also asked what would encourage more students to enter food animal careers. Students that have more experience with the curriculum in Colleges of Veterinary Medicine may propose different tactics to attract students to a career in a particular area of the profession. Similar to first year students, those in their third and fourth years of their veterinary education believe that financial aid to open a practice, paying tuition loans in exchange for work, and giving high school students good career information would be effective at attracting people to the area of food animal medicine. Third and fourth year students offered additional suggestions that were not mentioned by the younger students who were new to veterinary school. Senior students suggested adding more food animal faculty and job placement services in public health as well as changing the curriculum to allow for tracking in specific areas of emphasis. In our focus groups, the idea of rotating among veterinary colleges to complete coursework and capitalize on faculty expertise was viewed favorably by students.

## **Deans and Food Animal Faculty Views on Encouraging Food Animal Careers**

Deans and food animal faculty frequently have discussions and offer advice about career issues with their students. Students perceive successful faculty and Deans as knowledgeable experts about various job options and a valuable resource for career information. Despite perceptions of increasing demand based upon emerging zoonotic diseases, the increased globalization of the food supply chain, and the threat of bioterrorism/agroterrorism, academicians find it difficult to recruit qualified students to specialize and pursue careers in food production medicine. Even though this research shows that switching to a new concentration in

Veterinary College is a limited phenomenon, academicians perceive it be a common occurrence for students at their institution.

To gain a different perspective on what influences students' decisions to select food animal medicine as a career versus another occupational area in the profession, we asked Deans and food animal faculty to identify the most important factors that students discuss with them when choosing a particular position in veterinary medicine. This information can be used to encourage students to select a particular area of concentration in a College of Veterinary Medicine. Similar to the students, Deans and food animal faculty also believe that job selection decisions are strongly influenced by the ability to repay tuition debt. Congruent with our other findings, students tell Deans and food animal faculty they want a meaningful job that offers intellectual challenges and allows them to protect the food supply while caring for herds/flocks of animals. This generation of students tells academicians they think they can fully utilize their medical knowledge in food animal medicine, that they need to be nurtured by a mentor in their first job with a lot of training, and that they want to be able to arrange their time in order to spend sufficient time with family members. The importance of relationships with others and family for food animal students was a recurrent theme in our research.

We asked Deans and food animal faculty about policies that Colleges of Veterinary Medicine could implement to increase the supply of food animal veterinarians. These policies can serve as formal tactics to encourage more students to enter careers in food animal medicine. Admission policies, mentoring activities and curricular changes were the most popular tactics to increase food production veterinarians. Deans and food animal faculty seemed eager and willing to make changes to support food animal medicine at certain universities. Specifically, the respondents in the academic group think that reserving class slots, offering early admissions, and

a food animal career orientation session prior to the beginning of the first semester would increase the supply of graduates in this occupational area. The academicians were opposed to using gender as a criterion in the admission decision and did not want to lower GPA or standardized test scores as admission standards for food animal students.

In terms of the curriculum, several tactics were suggested. The faculty and administrators think that letting students treat and study food animals in their first semester in an intensive experience with a positive faculty mentor would improve the supply of food animal graduates. The creation of Centers of Excellence in Food Animal Medicine and Management (CEFAMM) at appropriate institutions is seen as a strategy to attract people to food animal medicine. Each CEFAMM would focus on a particular species such as beef cattle, dairy cattle, swine, or poultry. Students could rotate among partner institutions that share curricular responsibilities and take advantage of faculty expertise at the CEFAMM. The CEFAMM faculty could interact to pursue grants, create advisory councils, provide career seminars, and offer consulting services that utilize students to give experiential learning opportunities. It would serve to establish faculty and student externships in industry, practice, and government settings as well as conduct research, host conferences, and conduct continuing education courses. These tactics will require the addition of new resources for Colleges of Veterinary Medicine in terms of food animal faculty, space for increased student capacity, scholarship funds for tuition debt relief, and infrastructure changes to increase the caseload in food animal medicine for students in this area. It may also require the shifting of internal resources and the evaluation of strategic plans for Colleges of Veterinary Medicine to place more emphasis and a strategic focus on food animal medicine relative to other areas of concentration. Professional and industrial associations that focus on a particular species would also need to support the corresponding CEFAMM.

Deans and food animal faculty think students would be more likely to change from an area such as companion animal medicine to a career in food animal medicine with the appropriate amount of positive exposure to food animals very early in the curriculum. Having a positive faculty mentor to counsel students about career opportunities would also influence career selection and increase the probability of students changing to a career in food animal medicine. In congruence with this view, students expressed a strong interest in treating food animals in the first semester and hearing about career opportunities before school begins. The academicians think that students avoid food production careers because of little or no exposure to the area and the belief that the work requires so many hours that it will interfere with family life. Curricular changes that improved exposure to food animal cases in the first semester and an orientation session that presented a realistic, truthful overview of food animal medicine for students could remedy these problems.

Faculty mentioned that some of their colleagues actively discouraged students from pursuing a food animal medicine career. Faculty that discouraged students cited long hours, working on dangerous animals that would injure veterinarians, and alleged a poor quality of life in rural areas. Even though our systematic data shows that each one of these negative arguments is false, they are often believed by students that perceive faculty to be experts. Student echoed these sentiments and told us that food animal cases and knowledge were relegated to the end of a course and frequently not covered by disinterested professors.

Recruiters shared many ideas for Colleges of Veterinary Medicine to better prepare individuals for food animal medicine and enhance the hiring process. Recruiters think that more courses in food animal medicine and better business training should be added to the curriculum. Further, they think that student externships would improve training by giving students a practical

view of work. Recruiters argued that professional associations in veterinary medicine should provide more attractive job websites that described the position with a realistic preview to enhance the hiring process.

## **Summary of Strategies for Encouraging Food Animal Careers**

We identified many strategies that respondents with different perspectives believe will encourage more students to enter food animal medicine. Many of the suggestions were financial in nature and included offering eight-week paid summer externships, paying student loans in exchange for working in food animal medicine, and assisting in the establishment of food animal practices. We also found that mentoring activities were very important for students. Adding more food animal faculty to colleges, improving job placement services, and making curriculum changes were desired by students. Deans and food animal faculty agreed with the views of students but also wanted to reserve class slots, offer early admission and a career orientation session for food animal students. In addition, academicians think students should treat and study food animals in their first semester of veterinary medical school and that Centers of Excellence in Food Animal Medicine and Management should be established. From this line of research, we suggest the following:

R<sub>7</sub>: Students that specialize in food animal medicine should receive financial assistance in the form of tuition relief for each year that they work in this occupational area in an underserved area of their state as well as low interest loans or grants to cover the costs of start-up equipment.

R<sub>8</sub>: Veterinary students should receive greater exposure to the benefits of careers in food animal veterinary medicine. This exposure should include paid summer externship opportunities, increased numbers of food animal faculty, treatment of food animals in the first

semester of veterinary college, increased numbers of food animal courses, orientation sessions focused on food animal careers, and further study into creating regional centers of excellence.

R<sub>9</sub>: Veterinary students in food animal medicine should receive career selection assistance through assigned, enthusiastic faculty role models and dedicated job placement services.

R<sub>10</sub>: Professional veterinary associations should actively promote the benefits of a food animal veterinary career to all constituencies with an emphasis on how careers in this area provide meaningful work of importance to the nation and society, allow one to fully utilize their medical training, and provide opportunities to lead a life that adequately balances the demands of work and family.

R<sub>11</sub>: Colleges of Veterinary Medicine should consider early admissions programs for students interested in food animal medicine, reserved admission slots for those planning to enter food animal medicine careers, and explore the benefits of increased specialization provided by placing students into substantive curriculum tracks.

R<sub>12</sub>: Professional veterinary medical associations should establish formal programs that get their members involved with high school students, either in group presentations or one-on-one mentoring, in order to provide early food animal career exposure to potential students prior to college.

## **Career Switching From Food Animal Medicine**

This section deals with career switching to a new occupational area in veterinary medicine versus making a lifetime commitment to food animal medicine. Job satisfaction, career switching and occupational commitment were studied among students in veterinary colleges,

food animal veterinarians that had worked five or fewer years, and among more senior veterinarians that had worked from six or more years. In addition, we asked individuals that recruit veterinarians for jobs in their organizations about these topics. In this section, we will first discuss the major findings of our research based on the studies of veterinary students. We will then present the major conclusions about turnover and commitment for veterinarians already in the workforce and from the perspective of those who recruit veterinarians.

## **Career Switching Among Students**

Career switching is a small phenomenon that occurs with low frequency among students in Colleges of Veterinary Medicine. Only about one in five 4<sup>th</sup> year veterinary students reported that they had changed their career focus to an area that was different from what they originally intended when they entered veterinary medical school. This career focus switching among students takes place in nearly equal amounts across all four years of schooling in veterinary college. Food animal students are most likely to switch to a mixed practice career.

The overwhelming factor that generated this switching in career focus was the development of a new interest as a result of course work. Exposure to new material in courses interested students so much that they decided to explore new areas of veterinary medicine as a career option. Comparing the few food animal students that did switch to a new occupational area in veterinary medicine with those that changed from companion animal medicine, we find that those switching out of the food animal area are more concerned with time demands from being on-call, being unable to make full use of their medical/surgical skills, and not making enough money to pay off student loans. This finding is surprising in light of the fact that employed food animal veterinarians report they can make full use of their medical skills, make more money on average than companion animal veterinarians, and do not experience more time

management issues than other occupational areas. Former food animal students also expressed concern about limited job opportunities for a spouse, excessive travel, and the physical demands of food animal veterinary work. It should be noted that these are reported by students as being minor reasons for changing occupational areas from food animal medicine when compared to the development of new interests through course work as a motivating factor.

## **Career Switching Among Employed Veterinarians**

Recruiters of veterinarians were asked about turnover and retention issues in their organizations. Human resource personnel interview applicants for jobs and during these interview sessions conversations occur that deal with the factors that are important to the job candidate and the organization. They also conduct exit interviews with people leaving the organization and ask what the motivations were for changing jobs. We asked recruiters about their experiences with job candidates entering and employees leaving the organization and about what work was like at their organizations. Recruiters told us they experience little turnover and retention issues at their organization. However, recruiters did report a shortage of food animal veterinarians and they desired more applicants for food animal positions.

Human resource personnel portray veterinary jobs for which they hire as being very positive and associated with a quality lifestyle. This may be one of the reasons that turnover is so low in veterinary medicine and why retention is not a major problem. Recruiters state that there are many recreational, cultural, and shopping activities near work. Time management issues are not problematic for employees who are supposedly given flexible work hours, time off to deal with family issues, and vacations. Recruiters believe that veterinary employees enjoy good relationships with supervisors and have a lot of contact with animals. The positions that food animal veterinarians are recruited for require proficiency in many skills including oral and

written communication, team work, leadership, and analytic skills. This suggests that employees would be dealing with intellectually challenging work that is seen as highly rewarding.

To further understand why veterinarians change occupational areas, we conducted a multivariate analysis of recruiters' perceptions of what occurs in terms of turnover and retention at their organization. The human resource respondents think that the few veterinarians that do leave their organization believe they receive less training, have few opportunities for advancement, cannot deal with work/family balance issues, and perceive limited cultural and recreational opportunities. The small numbers of veterinarians that seek employment in other occupational areas also tend to have unrealistic job expectations and believe food animal work is too physically demanding.

Our research also identified the job characteristics that recruiters think applicants seek when they pursue employment opportunities. These findings help clarify for those hiring veterinarians what motivates applicants to actively pursue one job versus another. According to recruiters, some of the important job characteristics that are highly sought after by candidates include positions that offer a lot of training, advancement opportunities, and allow for community leadership. In addition, positions that are highly sought after allow for a good balance between work and family, provide realistic expectations, are near cultural activities, and are not too physically demanding. The same attributes that recruiters say typify jobs that are highly sought after at their organization are similar to the benefits that food animal practitioners describe as characteristic of their current jobs.

Our comparison of food animal positions with other occupational areas in veterinary medicine suggests additional positive characteristics of food production jobs that would further retard turnover. Food animal jobs are perceived to allow for greater managerial responsibility,

advancement, and community leadership when compared to companion animal jobs. Young people interested in food animal medicine frequently express the desire for community leadership. We did not find any statistically significant differences between occupational areas on time management issues or relationships with supervisors. Companion animal veterinarians were more likely to report feeling burned out from work than food animal veterinarians.

Early career veterinarians in the food animal sector choose to stay in their current job and do not intend to leave it. When comparing food animal medicine to other areas of the veterinary profession, this group reports a high degree of satisfaction. This may be one reason that contributes to the low turnover rate despite the fact that many have desirable career options outside of food animal medicine and many job offers. We asked the few that did change occupational areas during the first five years of work what motivated them to switch jobs. It was found that important drivers included the desire for a more balanced life between work/family and more recreational/cultural activities. Early career job changers had less pride and enthusiasm for food animal medicine and many attractive career alternatives.

Career switching is also uncommon among employed veterinarians that worked six or more years. Most senior veterinarians that had changed jobs stated they were happy in their former positions and that they had received adequate benefits, worked for a stable employer in a desirable area, and were able to use their medical/surgical skills. The main reason that employed veterinarians left their former jobs was because they received a more attractive offer in an alternative employment setting. Veterinarians that had worked six or more years reported high levels of satisfaction in their current job and reported that their jobs offered a good income and an adequate client base.

The high praise for the life of a food animal veterinarian as reported by those who actually perform this career explains much about the low levels of turnover in the profession. Senior food animal veterinarians told us they are satisfied, proud, and enthusiastic about their careers. They prefer food animal medicine to other areas in the profession and do not intend to leave it.

## **Summary of Career Switching from Food Animal Medicine**

We found that few students or practitioners switched from food animal medicine to other occupational areas. Of the few food animal students that did change their focus, the majority went to a mixed practice career. The major reason that food animal students switched their career focus was because they developed a new interest in another area as a result of their course work. Recruiters of veterinarians report veterinary jobs for which they hire as being a very positive work experience coupled with a quality lifestyle. Human resource personnel indicate that there is little turnover in their organizations. The main reason that senior veterinarians change jobs is because they have a more attractive offer in another organization. These findings suggest:

R<sub>13</sub>: We recommend that positive food animal practitioners serve as guest lecturers and visiting adjunct faculty to inform students and faculty about careers in food animal medicine.

## **Making a Lifetime Commitment to Food Animal Medicine**

Having evaluated turnover intentions among food animal students and practitioners, we now describe our research about making a lifetime commitment to food animal medicine and strategies that will maximize that commitment. The first set of conclusions deals with factors that influence students' decisions to make an initial commitment to food animal medicine. This

is followed by an examination of the major variables influencing practitioner career loyalty to a particular occupational area in veterinary medicine.

## **Student Loyalty and Food Animal Careers**

Our findings reveal that veterinary students think their career goals are capable of being met by their selected occupational area in the profession. The most important reasons that cause students to make a lifetime commitment to food animal medicine include a career that allows for a balanced lifestyle between work and family, an adequate salary, job security, and the opportunity to work with food animal producers on a regular basis. Students were asked about changes that could be made to food production medicine that would increase job commitment. The major changes in the food animal occupation that would get students to commit to this area include higher income, more flexible working time, more appreciation from producers for services rendered, and more job security. These are several of the same variables that students said were lacking in a food animal career and needed to be changed to reduce career switching.

Deans and food animal faculty were asked how to increase student commitment to food animal careers. Deans and food animal faculty think they can increase commitment to food animal careers by improving candidate selection during the admission process. The academicians also recognized the powerful role of food animal faculty on student career commitment. They believe that positive faculty mentors would increase loyalty to production medicine.

Financial considerations were also seen as having an important effect on students' career commitment by Deans and faculty. In addition to the literature that documented the well known heavy debt burden of many veterinary students, we often heard anecdotal stories about the hardships young people faced due to the extreme debt load incurred from increasing tuition

costs. This heavy debt from school has been hypothesized to inhibit the selection and commitment to certain areas of veterinary medicine. Providing paid externships and scholarships to those interested in and willing to make a commitment to this occupational area are seen as remedies that would increase career commitment to food animal medicine.

## **Practicing Veterinarians and Career Commitment**

Early career veterinarians that had worked in food animal medicine for one to five years expressed their views on increasing commitment to food production medicine. They reported that more continuing education training in business management, pharmacology, and neurology would increase commitment to a career in food animal medicine. Those veterinarians in the workforce for less than five years wished they had received more exposure to public health careers, more food supply courses during their veterinary education, and strong faculty mentoring to increase their commitment.

Senior veterinarians that had worked for six or more years were very committed to food animal medicine. Although they had many other job options, most reported they wanted to stay in their current job, and were satisfied with it in light of their career expectations. They are not actively seeking a substitute and prefer food animal medicine when compared to other areas of veterinary medicine. Reasons for the high level of commitment may be due to the low levels of stress and the respect they get from clients. In contrast, companion animal veterinarians are more likely to think their income is too low, worry about job benefits, and think they have fewer attractive career alternatives.

## **Summary of Lifetime Commitment to Food Animal Medicine**

In summary, we found that students and practitioners were very loyal to a food animal career. Maintaining a balanced lifestyle between work and family, having an adequate salary

with job security, and being able to work with food producers increased commitment to food animal medicine. Academicians think that commitment to a food animal career depends heavily upon admitting students with a rural background and providing these students with a positive faculty mentor. Practicing veterinarians desired more continuing education training in business management, pharmacology, and neurology to increase their commitment to food animal careers. We recommend the following strategies based upon this discussion:

R<sub>14</sub>: Continuing education certificates in business management, neurology, and pharmacology should be awarded to those who complete a series of short courses on these topics at Colleges of Veterinary Medicine.

R<sub>15</sub>: Enthusiastic food animal faculty should be recruited and rewarded to serve as role models and mentors for students interested in food animal careers.

R<sub>16</sub>: Debt relief legislation, similar to the national legislation, for food animal veterinarians should be pursued at the state level, where it is not at present.

R<sub>17</sub>: The number and dollar amounts of scholarships targeted toward food animal students should be increased.

R<sub>18</sub>: Colleges of Veterinary Medicine should consider adding admissions criteria that are favorable toward students interested in food animal veterinary medicine careers.

## **Conclusions**

The veterinary profession in the USA and Canada is at a crossroads that is marked by opportunities for growth and challenges that can limit the future. To achieve the ultimate objective of realizing the AVMA oath, the profession must change and take advantage of opportunities that exist in the current environment and directly confront the challenges. Traditional ways of doing and managing veterinary medicine are inappropriate in the future.

Placing too much emphasis on companion animal medicine at the expense of food animal medicine will cause the profession to miss many opportunities and endanger food safety, public health, and animal health.

The competitive advantage for veterinarians will stem from creating value for clients and their businesses at various points in the food supply chain. Changes need to be made in recruiting students, telling those interested in a career in food animal medicine the realistic, positive story about this occupational area, and working to increase commitment to a career in this area. The profession must decide if it intends to largely relegate itself to the treatment and welfare of two species -dogs and cats- or if veterinary work intends to encompass other species. If a greater view and a wider role for the veterinary profession are envisioned, then there must be a strategic commitment to the welfare of all animals and to maintaining a safe and wholesome food supply for the USA and Canada. The leaders in academia, government, practice, and industry as well as those in the major professional associations will have to join forces to take the veterinary profession to the next stage in its evolution by boldly allocating resources to food supply veterinary medicine. We share a sense of excitement with the thousands of people who participated in this research over the future of food animal medicine.