

Darcie J. Stolz, VMD

Darcie J. Stolz, VMD has been a food animal practitioner in Lancaster County, Pennsylvania for 29 years. She has owned and managed a 3-person food animal practice in Lancaster for the last 22 years. The majority of her practice is involved with dairy medicine, health and production, but includes some beef and small ruminant medicine as well.

Dr. Stolz received her B.S. from the Pennsylvania State University in 1974, and did her Master's work in Animal Nutrition at Penn State from 1974 to 1978. She graduated from the University of Pennsylvania School Of Veterinary Medicine in 1982, and immediately began working in a 2-person practice in Lancaster County. In 1989, she purchased the dairy, beef and small ruminant portion of that practice, and has owned and managed the practice since then. Her efforts have expanded the business into a predominately dairy practice, with an emphasis on herd health and production medicine programs. Dr. Stolz completed the Dairy Production Medicine Certificate Program offered jointly by Penn State and the University of Pennsylvania in 1994. She is a member of the American Veterinary Medical Association (AVMA), American Association of Bovine Practitioners (AABP) and Pennsylvania Veterinary Medical Association (PVMA), serving as a member of the Ag Liaison Committee for the PVMA since 1989. She has also served as representative for PVMA to the PA State Council of Farm Organizations. Dr. Stolz was elected to the AABP's Board of Directors in 2000, representing District 2 (Pennsylvania, Maryland, Virginia, Delaware and New Jersey), serving for 6 years. While on the board of AABP, she chaired the Research Assistantship Program, overseeing the disbursement of funding to AABP members for research. Dr. Stolz was also appointed Vice-Chair of the Animal Welfare Committee for AABP, and organized and coordinated the first Animal Welfare pre-conference seminar for AABP's annual conference. She was also elected to the Board of Directors for the Professional Animal Auditor Certification Organization (PAACO), serving in this position from 2004 to 2008. Dr. Stolz currently serves on the Board of Trustees as the Production Animal Medicine At-Large Trustee.

Dr. Stolz has been an invited speaker for several organizations, including the Association of American Veterinary Medical Colleges conference on "The Changing Face of Food Supply Veterinary Medicine". She was also honored to be invited as the 2009 commencement speaker for The University of Pennsylvania School of Veterinary Medicine.

Over the years, Dr. Stolz has been committed to trying to improve the well-being of her client's animals, as well as keep abreast of the topics and pressures that food animal practitioners face in our changing society. She welcomes the opportunity to work on the issues at hand for the benefit of PVMA, veterinary medicine, and animal agriculture in general.

Dr. Stolz can be reached at 717-413-9880 or darcie.stolz@verizon.net.

**Testimony of
Darcie J. Stolz, VMD, Owner, Dairy Production Medicine Associates,
Strausburg, PA
Production Animal Medicine At-Large Trustee, Pennsylvania
Veterinary Medical Association**

**House Agriculture and Rural Affairs Committee
State of the Dairy Industry Hearing – “Dairy 101 from the Cow to the
Consumer”
February 10, 2011**

Honorable Majority Chair John Maher, Honorable Minority Chair Joseph Petrarca, and Honorable Members of the House Agriculture and Rural Affairs Committee, thank you for the opportunity to offer remarks from the veterinary perspective on Pennsylvania’s dairy industry. I commend Chairman Maher on bringing together the stakeholders of this significant part of the Commonwealth’s agricultural community for this educational forum. It is critical that Pennsylvanians understand the importance of the dairy industry to Pennsylvania’s economic success, the importance of food safety as well as food security and why it is critical that we put in place the necessary support for this industry.

I am Dr. Darcie Stolz and I am a food animal veterinarian in Lancaster County. I am sure you are aware the county has the largest number of cows per capita in the state. More broadly, Lancaster County is also one of the most agriculturally dense and important food producing areas of the nation. I graduated from the University of Pennsylvania, School of Veterinary Medicine, in 1982. In 1989, I purchased Dairy Production Medicine Associates (DPMA) and have been owner since that time. DPMA is a 100% food animal practice comprised of 95% dairy and 5% beef and small ruminant. My practice currently has 3 veterinarians including me, and a secretary. However, although there are only 3 of us; there is always a veterinarian on call 24/7, 365 days a year. Our goals as a practice are not only to abide by the Veterinary Oath but also to provide services and education to our clients. We accomplish this through monthly newsletters, an annual client

education meeting, on-farm mini-client education forums, and written treatment protocols.

We are committed to help ensure the health and well-being of their animals, and thus enable the dairyman to produce a safe, wholesome, healthy product for consumers. A successful and efficient dairy industry also improves the ability of producers to be good stewards of the land and provide for a quality of life for their family. In other words, we work to keep Pennsylvanians in business and help agriculture; Pennsylvania's largest industry.

Our practice's clientele is 75% Amish and 25% Mennonite and English. Our client's farms are primarily family owned, and are small in size and utilize tie stall type facilities. Our larger herds are housed in free stall facilities. Herd size ranges from 30-500 milking cows with an average of 50-80 milking cows. The smaller dairies in our area often have a second industry to supplement their income such as tobacco and woodworking.

As a food animal veterinarian, I support dairy producers' efforts to keep their herds healthy and Pennsylvania's food safe. Just as you take your children or yourself to the doctor for regular check-ups and vaccinations, dairy veterinarians provide routine, preventative medical services to the animals in our care. We truly strive to promote health and protect against disease rather than to treat after the fact. Part of preventative care is measuring and monitoring production parameters. A healthy cow is a productive cow which produces a large quantity of high quality milk. By using established parameters such as Dairy Herd Improvement Association (DHIA) records and on farm measurements, veterinarians can intervene earlier when problems arise such as decreased milk production or milk component imbalances, and also assess the overall nutrition of the entire milking herd.

Another area that veterinarians assist with is udder health. We can monitor somatic cell counts (SCC), bulk tank milk cultures, treatment records and protocols, and DHIA reports. Quality milk is essential to meet consumer demands. Udder health impacts the quality of milk in factors such as shelf life and off flavors; improved udder health can increase production, and is extremely important for farm profitability and sustainability. Assuring high milk quality is critical to establish and maintain export markets.

The most important factor in profitability on the dairy is to have a healthy cow which will breed back in a timely manner to produce milk and provide herd replacements for the following year. Veterinarians monitor reproductive health using routine, on farm pregnancy diagnosis and uterine health check-ups, as well as monitoring DHIA reports and on farm data. They also recommend appropriate management strategies to maximize reproductive health to meet herd goals. Veterinarians monitor the growth of baby calves up to yearlings by measuring weight and height, and charting these measurements on growth curves. We develop vaccination protocols specific to each farm for both the young stock and adult herd.

Veterinarians are integral in improving cow comfort including all aspects of animal well-being. Veterinarians help ensure the quality of life of the animals, providing insight on housing and facility design to optimize cow comfort. We recommend management practices to implement which will improve and maintain cow comfort. We monitor progress by utilizing scores related to hygiene, lameness, body condition, hocks, and lying time.

Another critical role of veterinarians on farms is accurate diagnosis of disease. Veterinarians are the first line of defense for our food supply. By being on the farm and interacting with the herd, the veterinarian can identify early signs of disease and control outbreaks and minimize the potential for major impacts on public and animal health, and food safety. Once a diagnosis is made, veterinarians develop responsible treatment protocols. Treatment protocols are developed for each farm so that a written procedure is on the farm for the dairyman to follow for the treatment of specific problems. This helps to ensure that damaging effects to the entire herd are minimized and the health of each animal is restored as soon as possible. Written protocols also include proper handling and treatment of downed cows. When treatment of animals is unsuccessful or injuries are too extensive, veterinarians are responsible for directing the humane euthanasia of these animals.

Dairy veterinarians also recommend judicious, appropriate and legal pharmaceutical usage. They help ensure that no residues enter the food chain by establishing and promoting proper dosing strategies, optimum routes of administration, and withholding times. Proper and appropriate pharmaceutical use is paramount to maintain a safe and wholesome product for consumers,

especially in regards to antibiotic residues and resistance. It is important to note that this issue is hotly debated, but many research publications indicate that the majority of antibiotic resistance in humans does not come from animals. Through judicious antibiotic therapies, animal health can be maintained, consumers can be assured of high quality, residue free food, and antibiotic resistance is minimized. These issues are major concerns for Pennsylvania consumers, as in some Eastern US markets, dairy cows may provide nearly 50% of all beef.

Dairy veterinarians not only deal with infectious diseases, but most provide veterinary care for metabolic disorders like milk fever, ketosis, merits, orthopedic/musculo-skeletal diseases like lameness, trauma from lacerations, and obstetrical and reproductive cases like dystocia and C-sections. They also perform general surgery for abdominal conditions and teat end lacerations.

Veterinarians also assist producers with nutrient management by evaluating and sometimes formulating dairy rations. By assisting the herd's nutritionist or at times providing nutritional advice, cost effective feeding programs can be developed. This can greatly assist in promoting farm profitability while also helping producers develop plans for managing waste and minimizing the impact of their farm on the environment.

The care and well-being of dairy animals and the use of antibiotics to keep animals healthy and our food supply safe are under scrutiny by consumers of dairy products as well as concerned citizens. In general, producers and veterinarians have prided themselves over the past few decades by documenting significant production gains in all animal agriculture enterprises. In particular, the veterinary profession has been in the forefront in the development and promotion of significant improvements in the health and care of animals under their watch. Veterinarians are an essential component of the necessary infrastructure supporting the dairy industry. They are also the first line of defense on the farm in the case of a disease outbreak important to public health and food safety through their understanding of disease. Dairy veterinarians continuously improve their skills and knowledge to ensure the public that the dairy industry is meeting or exceeding accepted standards for food safety, environmental stewardship, and animal care.



American Association of Bovine Practitioners

Prudent Drug Usage Guidelines

The production of safe and wholesome animal products for human consumption is a primary goal of members of the AABP. In reaching that goal, the AABP is committed to the practice of preventive immune system management through the use of vaccines, parasiticides, stress reduction and proper nutritional management. The AABP recognizes that proper and timely management practices can reduce the incidence of disease and therefore reduce the need for antimicrobials; however, antimicrobials remain a necessary tool to manage infectious disease in beef and dairy herds. In order to reduce animal pain and suffering, to protect the economic livelihood of beef and dairy producers, to ensure the continued production of foods of animal origin, and to minimize the shedding of zoonotic bacteria into the environment and potentially the food chain, prudent use of antimicrobials is encouraged. Following are general guidelines for the prudent therapeutic use of antimicrobials in beef and dairy cattle.

1. The veterinarian's primary responsibility to the client is to help design management, immunization, housing and nutritional programs that will reduce the incidence of disease and the need for antimicrobials.
2. Antimicrobials should be used only within the confines of a valid veterinarian-client-patient relationship; this includes both dispensing and issuance of prescriptions.
3. Veterinarians should properly select and use antimicrobial drugs.
 - a. Veterinarians should participate in continuing education programs that include therapeutics and emerging and/or development of antimicrobial resistance.
 - b. The veterinarian should have strong clinical evidence of the identity of the pathogen causing the disease, based upon clinical signs, history, necropsy examination, laboratory data and past experience.
 - c. The antimicrobial selected should be appropriate for the target organism and should be administered at a dosage and route that are likely to achieve effective levels in the target organ.
 - d. Product choices and regimens should be based on available laboratory and package insert information, additional data in the literature, and consideration of the pharmacokinetics and pharmacodynamics of the drug.
 - e. Antimicrobials should be used with specific clinical outcome(s) in mind, such as fever reduction, return of mastitic milk to normal, or to reduce shedding, contagion and recurrence of disease.

- f. Periodically monitor herd pathogen susceptibility and therapeutic response, especially for routine therapy such as dry cow intramammary antibiotics, to detect changes in microbial susceptibility and to evaluate antimicrobial selections.
 - g. Use products that have the narrowest spectrum of activity and known efficacy *in vivo* against the pathogen causing the disease problem.
 - h. Antimicrobials should be used at a dosage appropriate for the condition treated for as short a period of time as reasonable, i.e., therapy should be discontinued when it is apparent that the immune system can manage the disease, reduce pathogen shedding and minimize recurrence of clinical disease or development of the carrier state.
 - i. Antimicrobials of lesser importance in human medicine should be used in preference to newer generation drugs that may be in the same class as drugs currently used in humans if this can be achieved while protecting the health and safety of the animals.
 - j. Antimicrobials labeled for use for treating the condition diagnosed should be used whenever possible. The label, dose, route, frequency and duration should be followed whenever possible.
 - k. Antimicrobials should be used extra-label only within the provisions contained within AMDUCA regulations.
 - l. Compounding of antimicrobial formulations should be avoided. When appropriate, local therapy is preferred over systemic therapy.
 - m. Treatment of chronic cases or those with a poor chance of recovery should be avoided. Chronic cases should be removed or isolated from the remainder of the herd.
 - n. Combination antimicrobial therapy should be discouraged unless there is information to show an increase in efficacy or suppression of resistance development for the target organism.
 - o. Prophylactic or metaphylactic use of antimicrobials should be based on a group, source or production unit evaluation rather than being utilized as standard practice.
 - p. Drug integrity should be protected through proper handling, storage and observation of the expiration date.
4. Veterinarians should endeavor to ensure proper on-farm drug use.
- a. Prescription or dispensed drug quantities should be appropriate to the production-unit size and expected need so that stockpiling of antimicrobials on the farm is avoided.
 - b. The veterinarian should train farm personnel who use antimicrobials on indications, dosages, withdrawal times, route of administration, injection site precautions, storage, handling, record keeping and accurate diagnosis of common diseases. The veterinarian should ensure that labels are accurate to instruct farm personnel on the correct use of antimicrobials.
 - c. Veterinarians are encouraged to provide written guidelines to clients whenever possible to describe conditions and instructions for antimicrobial use on the farm or unit.

Cull dairy cows can be at high risk for antibiotic residues; work with clients on drug use protocols and ensure a valid VCPR to prevent these issues.

By Jennifer Koeman, DVM, MSc, Center for Animal Health and Food Safety, University of Minnesota; Tim Goldsmith, DVM, MPH, Center for Animal Health and Food Safety, University of Minnesota; Ron Eustice, Director Minnesota Beef Council

In 2008 dairy cull cows accounted for 8% of all cattle harvested (excluding veal) at federally inspected plants. While dairy cull cows are a small part of total beef production, they carry a heavy burden — accounting for 90% of cattle residue violations (excluding veal) from inspector generated samples.

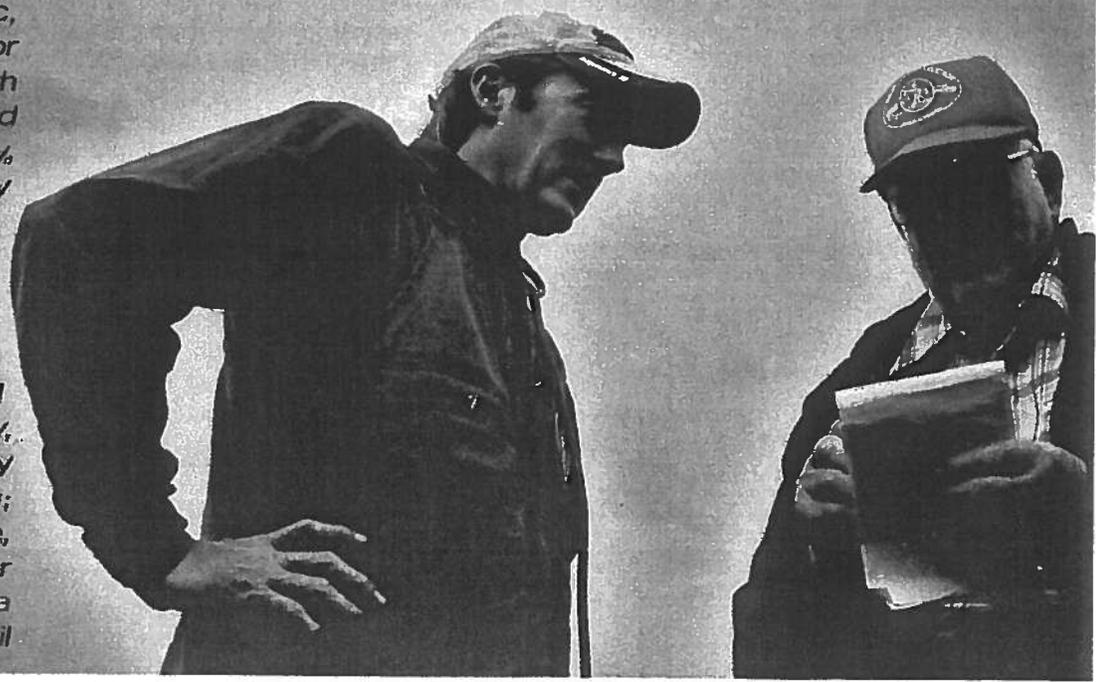
National Agriculture Statistics Service data indicates that in 2008 33,805,100 cattle (excluding veal) were slaughtered in federally inspected plants. Of those, 879 suspect cattle tested positive for a violative chemical residue (0.003% of cattle slaughtered). The distressing part of this data is that 791 of the positive cattle were dairy cull cows (90% of suspect

cattle that tested positive for a chemical residue violation at slaughter).

Violative residues were detected in 0.03% of all dairy cows slaughtered. In comparison, violative residues were detected in 0.001% of all beef cows slaughtered. So, while the percentage of violative residues detected in harvested dairy cows appears to be small, it is 30 times greater than the percentage of violative residues detected in harvested beef cows (numbers adapted from USDA 2008 National Residue Program data).

LEGISLATORS ARE TAKING NOTICE Issues that affect the quality and safety of

PROTECT ANTIBIOTICS WITH JUDICIOUS DAIRY USE



beef that originates from cull dairy cattle are an on-going concern for the beef industry. Any level of violative residue is unacceptable in the food industry.

Legislation is being considered in Washington, D.C. that would withdraw the routine use of seven classes of antibiotics from food animal production unless animals or herds are sick or unless drug companies can prove that their use does not harm human health. The Preservation of Antibiotics for Medical Treatment Act of 2009 has support of the American Medical Association, the American Public Health Association, the Infectious Diseases Society of America, the American Academy of Pediatrics and some 350 other organizations. The American Veterinary Medical Association, the American Association of Bovine Practitioners, the Academy of Veterinary Consultants and the American Association of Swine Veterinarians oppose the proposed legislation.

Legislative attempts to severely restrict or eliminate the use of antimicrobials in livestock are not the answer to these issues. Antimicrobials and other pharmaceuticals are an important tool in the production of safe and wholesome food such as beef. Restricting the use of these important tools has the potential for negative effects on animal health and welfare as well as human health.

Mastitis, followed by reproductive disease and lameness are the three most common diseases for which antibiotic treatments are used on dairy operations, according to the National Animal Health Monitoring System Dairy 2007 study. The report indicates that cephalosporin was the most common type of antibiotic used by operations to treat all diseases, while B-lactam antibiotics, such as penicillin, were the second most common type of antibiotic used to treat mastitis and reproductive diseases, and the third most common type of antibiotic used to treat lameness. This usage mirrors antibiotic residue data reported by federal inspectors using on-site antibiotic residue testing, in which penicillin was identified as the most

VCPR IS KEY TO PREVENTING RESIDUES

Responsible use of antimicrobials and pharmaceuticals is the answer to preventing and reducing antimicrobial residues in dairy cattle. A veterinary-client-patient relationship (VCPR) is paramount to ensuring that antimicrobials and pharmaceuticals are used according to best management practices. A VCPR is not only required by law for the use of prescription veterinary drugs, but is also a valuable resource for developing protocols for routine herd management and for clinical therapy and discussion about proper drug use, withdrawal time, antibiotic resistance and disease prevention practices.

A VCPR is the heart of the practice of veterinary medicine — it is the basis for interaction among veterinarians, their clients, and their patients. As defined in the AVMA's Principles of Veterinary Medical Ethics of the American Veterinary Medical Association, a VCPR exists when all of the following conditions have been met:

- 1 The veterinarian has assumed responsibility for making clinical judgments regarding the health of the animal(s) and the need for medical treatment, and the client has agreed to follow the veterinarian's instructions.
- 2 The veterinarian has sufficient knowledge of the animal(s) to initiate at least a general or preliminary diagnosis of the medical condition of the animal(s). This means that the veterinarian has recently seen and is personally acquainted with the keeping and care of the animal(s) by virtue of an examination of the animal(s), or by medically appropriate and timely visits to the premises where the animal(s) are kept.
- 3 The veterinarian is readily available, or has arranged for emergency coverage, for follow-up evaluation in the event of adverse reactions or the failure of the treatment regimen.

common violative residue detected in dairy cull cows according to the USDA.

CAUSES OF ANTIBIOTIC RESIDUES

Common situations leading to unintentional misuse of antibiotics may include insufficient knowledge about drug withdrawal periods, employee error, insufficient treatment records, poor identification of treated animals, and inadequate communication between veterinarian and producer.

A recent survey of antibiotic use and biosecurity practices among Washington state dairy producers and published in a 2006 Journal of Dairy Science highlights many of these underlying gaps. Out of 381 respondents, less

In a University of Minnesota survey, more than 18% of bovine practitioners surveyed cited poor communication between veterinarian and producer as a major reason of dairy producers' lack of compliance with drug use instructions that could potentially cause a violative residue.

The Center for Animal Health and Food Safety (CAHFS) at the University of Minnesota College of Veterinary Medicine and Minnesota Beef Council (MBC) work in partnership to assist dairy producers and veterinarians in ensuring that dairy beef meet beef quality assurance (BQA) standards. Recently the CAHFS and MBC have developed brochures and posters on responsible antibiotic use, available in both Spanish and English. Visit the Minnesota Beef Council for these and other BQA materials at www.mnbeef.org or the national Beef Check off-funded site at www.bqa.org.

than one-third had written protocols for diagnosing or treating common medical conditions. Most agreed that such protocols could reduce errors and production losses.

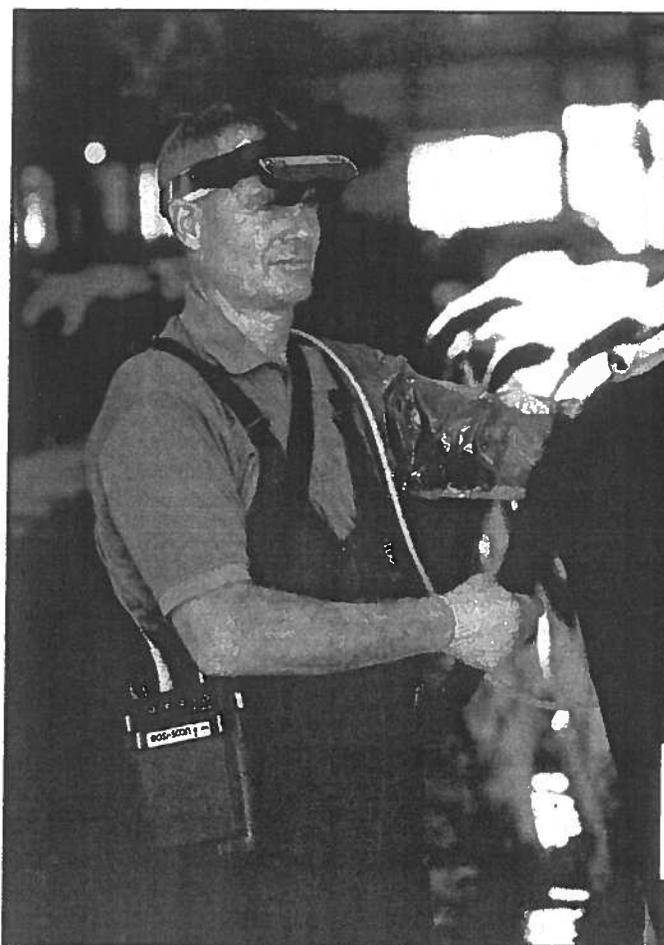
In a University of Minnesota survey, more than 18% of bovine practitioners surveyed cited poor communication between veterinarian and producer as a major reason of dairy producers' lack of compliance with drug use instructions that could potentially cause a violative residue. Lack of understanding of residue avoidance practices was cited as the second most common reason for non-compliance by producers in the study published in a 2008 *Bovine Practitioner*.

HOW IS IT BEING ADDRESSED?

The American Veterinary Medical Association has developed multi-species guidelines for judicious therapeutic use of antibiotics in multiple species. The guidelines can be accessed on the AVMA website at <http://www.avma.org/issues/default.asp>.

The Minnesota Veterinary Medical Association — Farm Animal Pharmaceutical Committee (MVMA-FAPC) works to keep veterinarian members up to date on issues related to pharmaceutical use in food producing animals. The FAPC monitors current federal and Minnesota drug regulations for food animal practitioners, communicates new information to members, and works to assist members with their efforts to be compliant with the current legal standards and guidelines surrounding the use and distribution of drugs for use in food animal species.

The University of Minnesota's College of Veterinary Medicine has developed and piloted a new software package to aid in writing protocols and producing veterinary prescriptions under a valid VCPR (www.cvm.umn.edu/mdbp/home.html). Version 1.0 of the new Veterinary Protocol Manager software is expected to be available in 2010 through the Veterinary Population Medicine Department at the College of Veterinary Medicine. 



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COCCIDIOSIS WEBSITE

Coccidiosis has a major economic impact on both beef and dairy producers in the United States and worldwide. The cost of the disease on a worldwide basis is estimated at \$400 million USD and this does not include losses on reduced gain and feed efficiency, which are the effects of subclinical coccidiosis. It has been estimated that 95% of the losses are from subclinical coccidiosis infections that producers fail to identify.

A new website, <http://coccidiosis-treatment.com/>, contains information on diagnosis, prevention and clinical signs of coccidiosis. The information contained in this website is intended to assist in identification of the disease and programs to prevent or control coccidiosis.

ANTIBIOTIC-BAN CONSEQUENCES

The Competitive Enterprise Institute recently submitted comments on an FDA proposal to limit the use of certain antibiotics in livestock, warning that a ban could unintentionally increase the threat of foodborne illness in the United States.

The FDA draft guidance would prohibit the use of "medically important" antibiotics for growth promotion in food-producing animals such as cows, pigs and chickens, and would require veterinary oversight for remaining uses. In its comments, CEI warned that "uses of these drugs for growth promotion reduces pathogen loads in animal-derived foods and have a positive impact on human safety, so such restrictions could do more harm than good."

Antibiotic use in livestock has been criticized by the public health community due to concerns that it contributes to the development of antibiotic resis-

KSU ONLINE BEEF TRAINING RESOURCES

A series of online videos, hosted by Kansas State University, can help beef producers and processors keep pace with changes in most every step of the production cycle. As part of its Beef Quality Assurance Program, K-State's Beef Cattle Institute has expanded to an additional website, "Animal Care Training" (www.animalcaretraining.org).

Dan Thomson, DVM, PhD, director of the Beef Cattle Institute at K-State, says the program educates workers in all sectors of the beef industry, from the newly hired to the seasoned veteran. The program has also fills in the gaps created by dwindling resources. "We're running low on people, time and opportunities for face-to-face meetings to actually carry out some of this training. So, to augment or supplement some of this face-to-face training, or on-the-job training, we have produced a series of online training modules," he says.

The program is entirely self-paced — participants can log in and watch videos as many times as they like, 24 hours a day. The modules are available in both English and Spanish. The topics

covered in the training modules continue to evolve, as participants return to the site, seeking further training.

"We've seen an evolution in BQA from 'How do we move our injection sites to the neck?' to 'How do we make sure that we use our animal microbials in a proper manner?'" Thomson says. "It's not only what the product is, and how wholesome the product is," he continued, "but now we have to look at how we actually raise these animals, and that's something that may be going on the label of our beef products, as well."

There are about 150 training modules, ranging between five and ten minutes in length. To access the training, visit the Beef Cattle Institute website (<http://beefcattleinstitute.org/>) and select "Animal Care Training". Payment can be made by credit card, or an invoice can be mailed.

Each module ends with a short quiz — at least 80% of the questions must be answered correctly for a passing grade. The subscriber will then be emailed a personalized certificate to document completion of that module.

tant bacteria. However, U.S. government studies indicate that livestock uses account for only about 10% of the problem with resistant bacteria and that misuse in human patients is the leading cause of antibiotic resistance.

"Whether you're talking about human or animal use, banning beneficial uses today can have negative impacts on human and animal health just as surely as a lack of long-term drug efficacy can," said Gregory Conko, CEI's Director of Food and Drug Policy. "Instead, we need to balance the current benefits of antimicrobial use against the inevitable development of resistance, and this can include using antibiotics for livestock growth promotion purposes."

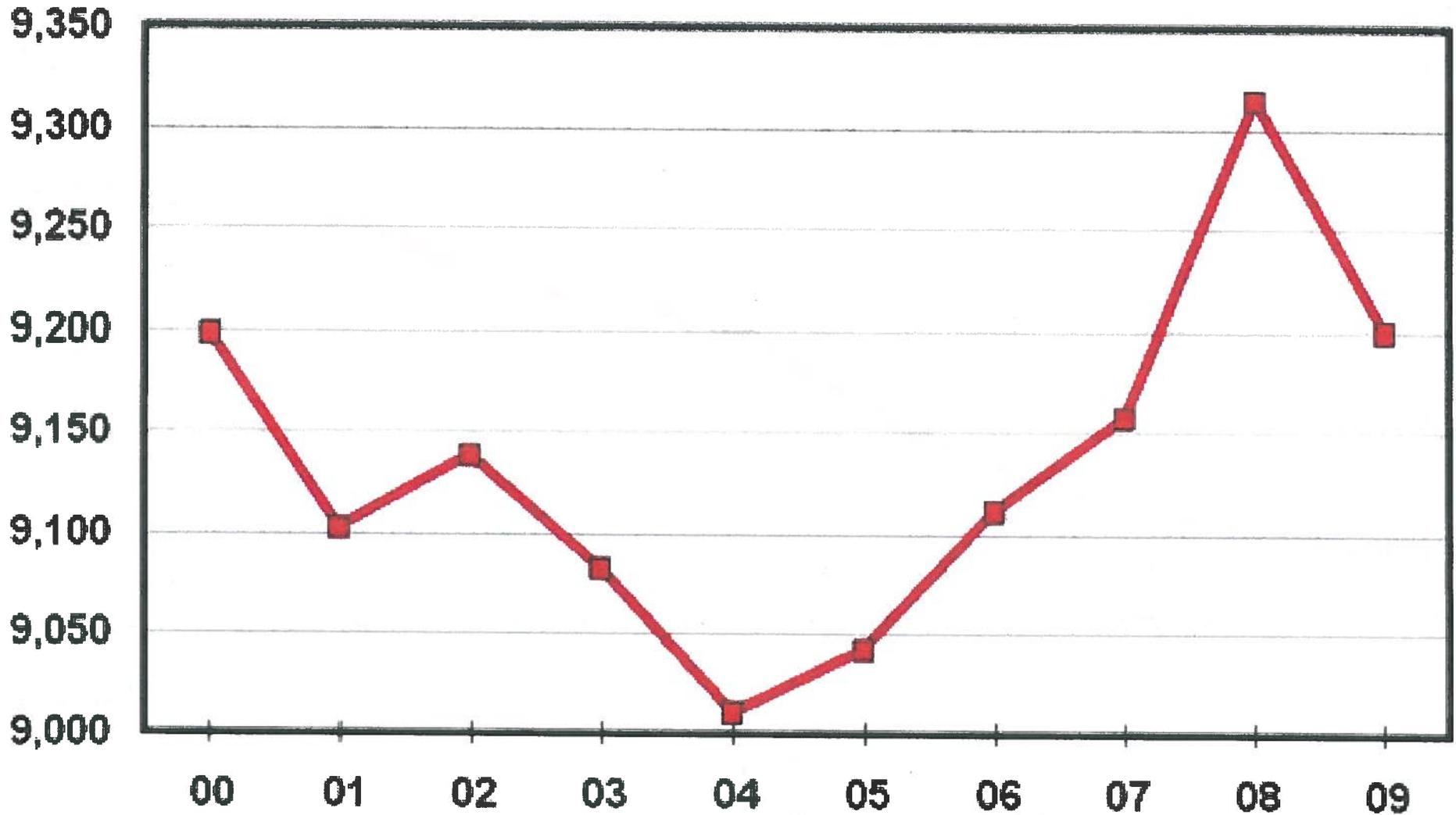
The FDA already regulates animal antibiotic use very stringently and mandates efforts to slow down the development of bacterial resistance. Many governments in Europe have banned the use of antibiotics for growth promotion purposes, but with little or no effect on the development of resistant bacteria.

"After the U.K., Denmark, and then the entire European Union banned antibiotic use for growth promotion, the incidence of many resistant bacteria increased, not decreased," said Conko. "Those bans have increased the cost of raising animals and made food more expensive, but they've done absolutely nothing to improve public health."

Milk Cows, 2000-2009

United States

Thousand Head



USDA-NASS
02-19-2010

Rate per Cow, 2000-2009

United States

Pounds

21,000

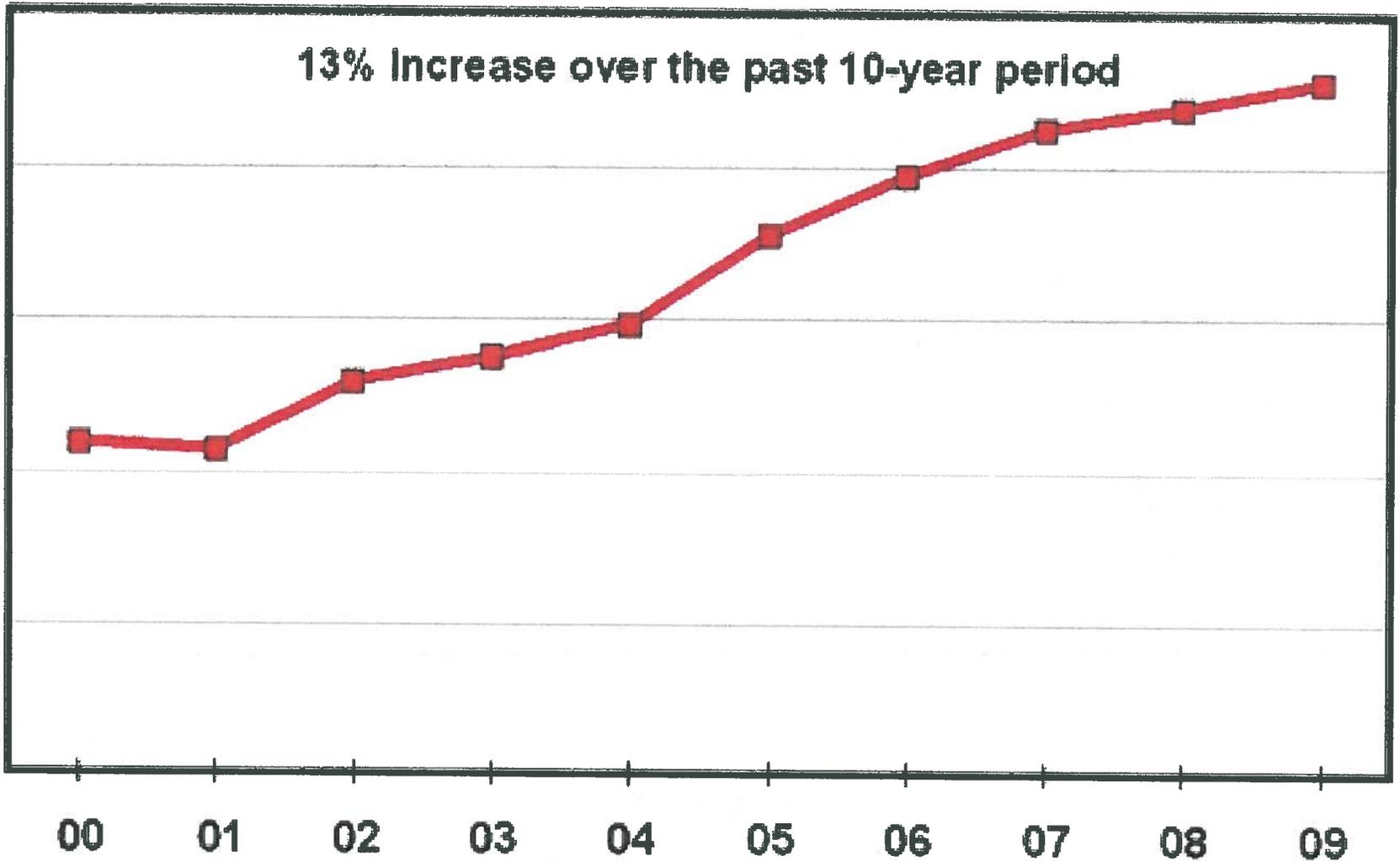
20,000

19,000

18,000

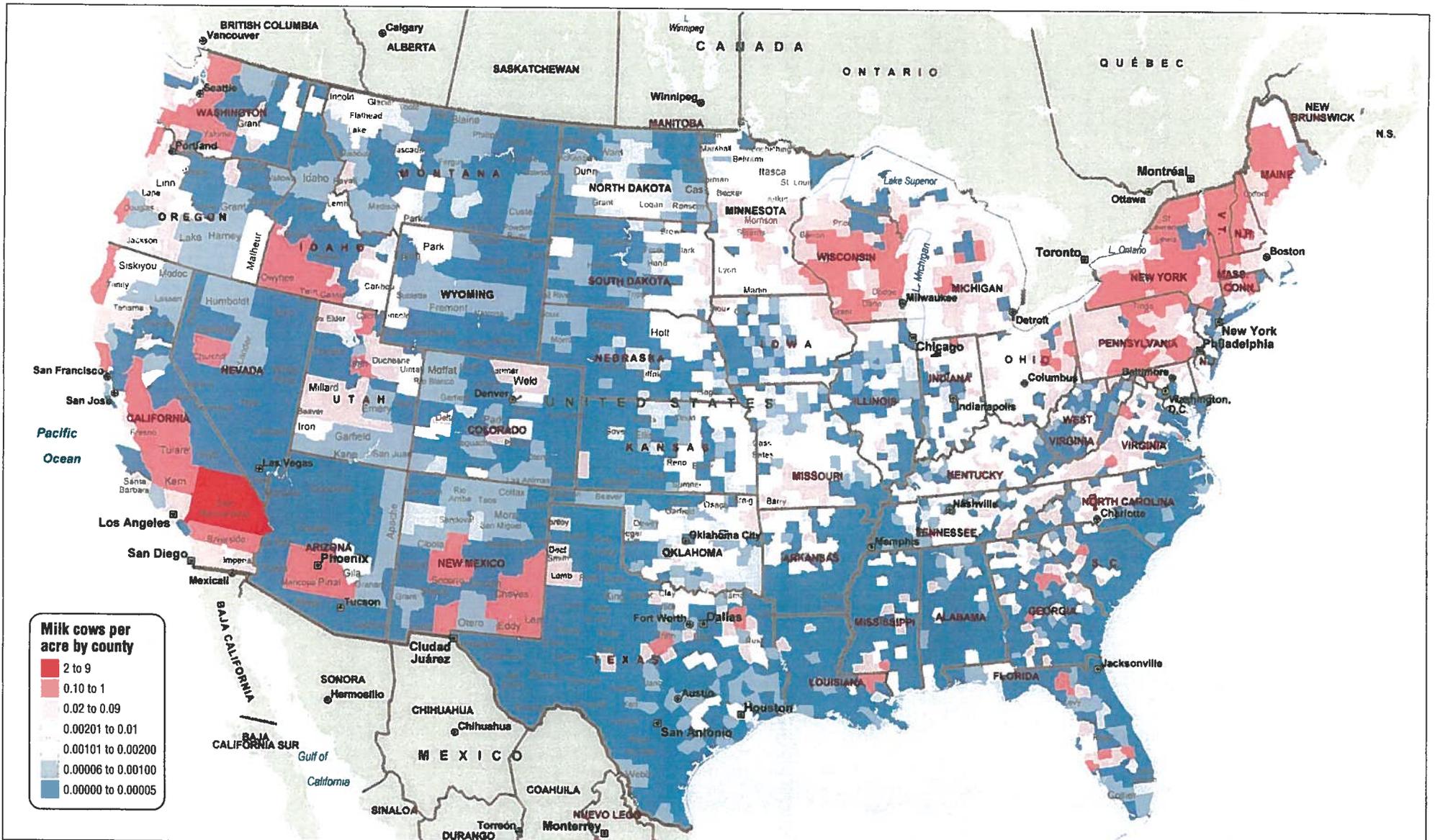
17,000

16,000



USDA-NASS
02-19-2010

Milking cow density by county



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This map plots the milking cow inventory per cropland acre by county based on data from the 2007 Census of Agriculture. The 10 most dairy cow-dense counties included San Bernardino, Cal. (3.067 cows per acre); Tillamook, Ore. (1.563 cows per acre); Gooding, Ida. (1.049 cows per acre); Chaves, N.M. (0.997 cows per acre); Lafayette, Fla. (0.911 cows per acre); Marin, Cal. (0.816 cows per acre); Tulare, Cal. (0.743 cows per acre); Okeechobee, Fla. (0.726 cows per acre); Del Norte, Cal. (0.696 cows per acre), and Whatcom, Wash. (0.664 cows per acre).

February 6, 2007

A New Problem for Farmers: Few Veterinarians

By **PAM BELLUCK**

GORHAM, Me. — Rainbow had the bad luck to try to have a baby on a Thursday.

Thursday was her doctor's day off, and there was no one else for miles who could handle a complicated breech birth, not when the mother was a Holstein cow.

"Had the vet been here, we could have done a C-section and she could have lived through it fine," said Becki Benson, the owner, with her husband, Eddie, of Rainbow and 150 other dairy cows.

Instead, "I worked on her till I was just exhausted," Mr. Benson said. "But I ended up having to take the cow to a butcher shop, where she got processed for hamburger."

These days, the Bensons' veterinarian is pretty much the only cow doctor in a 1,300-square-mile swath of Maine, and one of only about 30 large-animal veterinarians left in the entire state.

And across the country, veterinarians who care for the animals that provide the United States with food are in increasingly short supply.

For one, there is generally more money to be made caring for cats and dogs. And with fewer students from farm backgrounds, fewer gravitate to rural jobs, especially if a spouse needs work, too. Large-animal care can be tough, even dangerous — think of maneuvering in frigid weather around 1,000-pound cows in manure-filled pens. And more veterinarians are women, generally less inclined toward large animals.

Since 1990, the number of veterinarians focusing on large animals has dropped to fewer than 4,500 from nearly 6,000, according to the American Veterinary Medical Association, which said those doctors now made up less than 10 percent of private-practice veterinarians. A recent study predicted that by 2016, 4 out of every 100 food-animal veterinary jobs would go unfilled.

"We look at it as a crisis," said Dr. Roger Mahr, the association's president, who cited serious consequences not only for the well-being of farmers and animals, but also potentially for food safety and the impact of non-native diseases like bird flu.

“Of all the emerging diseases in people in the last 25 years, 75 percent of those were transmitted from animals,” Dr. Mahr said. “Veterinarians are the ones to identify those diseases in animals first.”

Pressed to address the problem, Congress enacted a law in 2004 offering to repay the student loans of veterinarians working in underserved areas, but it has received little financing.

States are jumping in, with loan repayment or grant programs under way or proposed in Kansas, Maine, Missouri, North Dakota, Texas and elsewhere.

In Iowa, students at the state’s veterinary school formed Vsmart, which barnstorms county fairs and 4-H meetings to entice teenagers to become rural veterinarians.

And in Oklahoma, State Representative Don Armes, Republican of Faxon, has introduced a bill offering tax breaks to large-animal veterinarians. Mr. Armes, a cattleman, knows the shortage firsthand, especially after one Friday last summer when a heifer struggled to deliver a large calf.

“I called six different veterinarians and could not get any of them,” Mr. Armes said. “We lost the calf. Almost lost the heifer.”

The dearth of food-animal veterinarians (the shortage is not as critical for horses) reflects seismic shifts in farming, veterinary medicine, the economy and American culture.

Money is critical when veterinary students graduate \$100,000 in debt. While some say salaries can be the same, no matter the animal size, many say small-animal practices are more profitable, allowing for dozens of clinic appointments daily instead of requiring trips of long distances between farms and ranches. And dog or cat owners more often pay for expensive surgery and treatment.

“For Fifi the family dog, you’ll spend \$1,500 or \$2,000,” Mr. Armes said. “That old cow — at some point economics kick in and you say if she’s going to cost \$1,500, I can buy two cows for that, so I should have shot her.”

Tembra Gatlin, 27, who was reared on an Oklahoma ranch, started veterinary school “large animal all the way,” she said.

She changed her mind after doing “a C-section on a cow and it’s 50 bucks,” Ms. Gatlin said. “Do a C-section on a Chihuahua and you get \$300. It’s the money. I hate to say that.”

A study by the American Veterinary Medical Association found the median starting salary of large-animal veterinarians to be \$60,500, \$11,000 less than that of small-animal veterinarians. For veterinarians practicing 25 years, the gap was even wider: \$98,500 for large-animal

practitioners, \$122, 500 for small.

In Maine, the closing of about 250 dairy farms since 1993 makes it harder to attract new veterinarians and leaves remaining farm doctors overstretched.

“If you can’t get a vet or it’s so expensive because they have to travel such a distance, farmers end up just dealing with it themselves, and in a lot of cases that’s not a good idea,” said Dr. Donald Hoenig, Maine’s state veterinarian.

Timothy Leary, a farmer in Saco, Me., nearly lost a cow with a prolapsed uterus when no veterinarian was available. “You either eat your mistakes or you bury them, if you literally can’t get anyone,” Mr. Leary said. Even the small-animal clinic where Mr. Leary’s wife is a technician could not help him.

Dr. Dennis M. Brewster treated animals of the Bensons’ and other farmers until a few years ago, when he felt forced to switch to dogs and cats because he could not find another large-animal doctor to help cover emergencies.

“I just didn’t want to face all of these dear people and tell them that I could not come to their farm for an emergency, and then when I showed up have them say, ‘You know that prize cow you didn’t come for died,’ ” he said. “Now, some farmers have had to make hard decisions. They’ve had to kill cows for things that we used to fix.”

The Bensons, who raise valuable cows for breeding as well as milking, now shoulder many veterinary responsibilities, giving cows antibiotics for mastitis and intravenous calcium for milk fever.

Their current veterinarian, Dr. Becky Myers, 52, worked for years round the clock.

“Half killed myself,” Dr. Myers said. Back problems developed. A cow broke her hand.

When she had a baby son, farmers with sick animals “would be pushing the stroller around while I was pushing a cow’s uterus back in. I used to call people in the middle of the night to come over and watch him when a farmer called. He gave me the nickname Mommy Moo.”

Three times she managed to hire partners, but they either left Maine or large-animal care. In 2003, Dr. Myers said, she scaled back to four 10-hour days, “which people here consider to be part time.”

Before reducing her hours, Dr. Myers held a training session for farmers, providing a detailed manual with tips on giving cows anesthesia and pumping their stomachs. Her schedule is still packed. One recent day was spent vaccinating calves for brucellosis, helping a sheep give birth,

poking into a heifer's uterus to determine pregnancy, inserting magnets into a sick cow to attract metal fragments it might have swallowed and examining an arthritic goat whose owner had driven 70 miles because no doctor was nearer.

But with so few counterparts — one of the closest is Doc Cooper, 80, an hour's drive north — “people get stuck and I feel really bad about it,” she said. “It was one of those decisions — is my health and my family life more important or less important than somebody's cow?”

Dr. Myers once visited the Bensons every 10 days; now it is once a month. They understand her need to cut back. Still, just in the last month, one cow, Darling, had a foot problem the Bensons could not diagnose. Another, Karissa, had mastitis, but the Bensons initially misdiagnosed the strain and gave the wrong antibiotic, delaying her recovery and milk production.

And Alpha, a cow worth thousands of dollars, became weak and feverish after miscarrying twins, unfortunately on a weekend. When the Bensons tried moving her to a comfortable pen, she literally dropped dead.

“The fact that there's nothing you can do, you accept it as a business expense now,” Mr. Benson said. “You didn't used to. If you have livestock, sooner or later you're going to have deadstock.”

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Special Report

Veterinarians in Population Health and Public Practice: Meeting Critical National Needs

Kent H. Hoblet; Andrew T. Maccabe; Lawrence E. Heider

EXECUTIVE SUMMARY

The Association of American Veterinary Medical Colleges (AAVMC) recognizes that its member colleges and departments are at a critical decision point, as is the veterinary profession itself. The outcome of decisions made now may well determine the future of the profession and its contribution to the nation's welfare. Resources, including the infrastructure available to support educational programs, are limited, and without careful and informed decisions at several levels, opportunities to benefit both society and the veterinary profession will be lost.

Over the last half-century, as our society has changed, veterinary medicine and its educational institutions have, to a great extent, reflected this change. Urbanization and affluence have led to increased demands for companion animal veterinary medical care. At the same time, critical national needs in public health, food safety and security, animal health, and comparative medicine continue to increase at an alarming rate. These needs can most effectively be addressed by veterinarians with expertise in population health and public practice.

Veterinarians are a unique national resource, as they are the only health professionals trained in multispecies comparative medicine. As a result of this training, the veterinary profession is able to provide an extraordinary link between agriculture and human medicine. The uses made of this link have been extensive, with multiple benefits to society. In fact, public support for veterinary medical education has, as its historical basis, the profession's relationship with food production and the control of zoonotic diseases.

Currently, approximately 20% (15,000) of all veterinarians in the United States are engaged in either private population-health practice with a significant food animal component or public practice in one of its various forms. Satisfying only current needs in population health and public practice will require more than 500 of the approximately 2,500 available new US graduates each year. If new graduates do not enter these fields, government, non-governmental organizations, industry, and agribusiness will employ either foreign-trained veterinarians or non-veterinarians to fill their needs.

Colleges must diversify the applicant pool and work to retain, in population-health and public-practice pathways, both students and those in the early years of their careers. Core courses in epidemiology, public health, and preventive medicine are pivotal to maintaining interest in this career pathway and must be included in the curriculum. Creative ways to include a core clinical learning experience in population health and public practice should be developed. Colleges, probably in regional or national consortiums, should offer specialty training programs for population health practitioners, such as MPH, residencies in laboratory animal medicine, and other non-thesis, Master's degree programs. There is a critical need for infrastructure in our colleges and departments to support research and the graduate training of DVM-PhD scientists in epidemiology, pathology, and infectious diseases.

Issues such as food safety and public health are not merely the concern of individual states but are of national, and even global, importance. Therefore, they may be most appropriately addressed by a collective partnership among the veterinary medical colleges, departments of veterinary science, departments of comparative medicine, and the federal, as well as all state governments. Further strategic development of the veterinary medical educational infrastructure and resources, together with shared responsibility and accountability, will benefit all Americans and optimize the national efforts required to meet challenges in public health, food safety and security, animal health, and comparative medicine.

BACKGROUND

Veterinary medical colleges and the graduates they produce are a unique national resource, whose full potential remains unrealized. Beginning with the founding of the first US college of veterinary medicine in 1879, the mission of our institutions has been to address the nation's needs in animal and public health. These needs have continued to change and expand in scope as our society has changed. In the early years, our colleges reflected the needs of an agrarian population and the academic focus was primarily on controlling disease in agricultural animals and on associated issues in public health, such as brucellosis and tuberculosis. In the last half-century, with general advances in science and the urbanization of our population, additional demands have been placed on the veterinary profession. Throughout this period of change, the colleges and the profession have demonstrated a remarkable ability to adapt. Building beyond the profession's traditional base in agriculture and public health, many veterinarians have become key contributors to biomedical research. Currently, the majority of veterinarians are involved in meeting the public's ever-increasing demand for companion animal medicine.

New opportunities and challenges, given that resources are limited, will require further adaptation. The colleges and the veterinary profession have now reached a critical decision point, which may well determine the overall contribution of the veterinary profession to the nation's future. Not only are the resources available for education limited; the overall number of veterinarians is limited and there are shortages of veterinarians in several critical areas of professional expertise. Furthermore, changing national demographics are reflected in a lack of diversity of interest among those applying for admission to veterinary college. The veterinary medical colleges, with input from constituency and stakeholder groups, must identify, address, and prioritize current and future needs. Working together, they must develop a clear plan that better aligns professional resources with societal demands. Without such a plan and the means to sustain it, many of those national needs that the veterinary profession is so singularly qualified to address will not be met.

VETERINARY MEDICINE: THE CRITICAL LINK

Public support for veterinary medical education has historically been based on the profession's role in public health. In Western societies, this role has been to provide a critical link between agriculture and human medicine. The uses made of this link have been

extensive, and their effects, far-reaching. Benefits have included improved food safety and food security, better understanding and control of zoonotic diseases, and enhanced regulatory procedures that promote animal and public health and protect the nation's well-being. In recent times, partially as a result of the profession's failure to communicate effectively and certainly much to its disadvantage, the unique link provided by veterinary medicine has been frequently overlooked by policy makers, as well as by the general public.

The veterinary medical colleges have been key players in the process of building linkages through their distinctive role of educating veterinarians as health professionals. However, from the very beginning, the mission of the colleges has involved more than teaching alone—it has also included research. The benefits of a core veterinary medical education, based on sound biomedical science and with broad clinical training across multiple vertebrate species, has been used to great advantage in scientific investigations of animal and human disease, as well as in animal models of human diseases.

The faculties of the veterinary medical colleges have also contributed their expertise, as a service in the public arena and for the benefit of public health. In many cases, opportunities for teaching, research, and service have been identified and pursued in a parallel and nearly seamless manner. Animal disease, the single most important impediment to livestock production, has been recognized as having a direct and adverse impact on food security, the national economy, and public health. Successful joint efforts between colleges and public agencies have included the control and eradication of animal diseases important to agriculture, trade, and public health, such as Texas fever, contagious bovine pleuropneumonia, and brucellosis. There is abundant evidence that public and private investment in veterinary medical education and research has strengthened the link between agriculture and human medicine and has had positive impacts on our society.

CONTINUING CHALLENGE

For more than 100 years, veterinary medical colleges have effectively delivered a core educational program that has enabled veterinarians to adapt and respond to evolving societal needs. Nationally and internationally, we have now reached a point where there is an ever-increasing and diverse array of societal needs that could most effectively be addressed by veterinarians with expertise in population health and public practice. Resources available for educational programs to address these needs are limited, and without careful and informed decisions, opportunities for actions that may ultimately be of great benefit to both the public and the veterinary profession will be lost. The challenge is for the colleges to continue to deliver an educational program that clearly defines a veterinarian as a special health professional, uniquely qualified to continue to adapt as required to meet broad national needs.

While the future is defined by uncertainty, there will continue to be many needs that can best be met by veterinarians trained in population health and public practice. If food safety and security and public health in the United States are to continue to meet the highest standards, issues of emerging and re-emerging animal and zoonotic diseases must continue to receive the profession's greatest attention. We now live in a global economy, with world population expected to grow to 7.3–8.4 billion by 2025.⁽¹⁾ The impact of veterinary medicine and the veterinary academy on national security, the national economy, and international trade is also far-reaching. For example, all Category A threat agents, with the exception of smallpox, and all Category B threat agents are zoonotic. These challenges, combined with the fact that veterinarians are the only health professionals trained in multispecies medicine, present an unparalleled opportunity to provide a bridge between agriculture and human medicine.

Many of the national and global needs of the twenty-first century in public health, food supply, ecosystem health (especially as related to food production), and biodefense can best be met if adequate numbers of appropriately trained veterinarians are available. This observation was reinforced when the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction⁽²⁾ recommended to the Secretary of Defense "that the Secretary of Agriculture develop and that Congress fund, programs to improve higher education in veterinary medicine to include focused training on intentional attacks, and to provide additional incentives for professional tracks in that discipline."

For the veterinary profession, both the challenges and the opportunities are great. If the proper decisions are made at several levels (i.e., colleges, state and federal governments, and professional organizations), these challenges will be met and society will continue to benefit from its collective investment in veterinary medical education.

ISSUES, OPPORTUNITIES, And RECOMMENDATIONS

1. Demographics

Based on both the education required and the potential career pathways that are available, there is a continuum for veterinarians engaged in population health that extends from private practice with a food animal component to public practice in many of its forms. Conservative estimates indicate that there are more than 15,000 veterinarians in the US employed in population health, either in public practice or private practice with a food animal component. This represents approximately 20% of all US veterinarians.⁽³⁾

A. Public Sector Veterinarians - If a steady-state level of employment is assumed, projecting needs for public-sector population health veterinarians is relatively uncomplicated. For example, several federal agencies face impending staff shortages. The average age for USDA Food Safety and Inspection Service (FSIS) veterinarians is 54; approximately 500 veterinarians are expected to separate from the USDA in the next five years.⁽⁴⁾ Approximately half of the veterinarians in the Commissioned Corps of the United Public Health Service (USPHS) are currently eligible for retirement.⁽⁵⁾ To maintain its current effective strength, the US Army Veterinary Corps requires an addition of 45 new veterinarians each year.⁽⁶⁾

B. Traditional Private Practice - Estimating needs for veterinarians engaged in private practice with a food animal component is somewhat more difficult than projecting public sector requirements and is currently the focus of a study by a consortium of food animal veterinary associations. The difficulty is primarily a result of the rapidity with which food production systems in the US are changing. There is general agreement that, although consolidation of livestock production units will likely continue in the foreseeable future, there will also be a need for veterinary services for smaller livestock operations. These smaller operations may be located in rural communities or at the rural-urban interface and veterinary services will most often be provided by general practitioners, many of

whom will devote a decreasing proportion of their time to food animal practice.

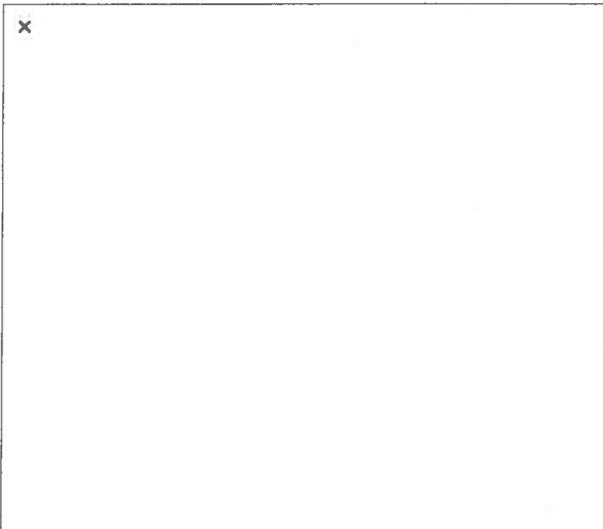
Small livestock operations have a much greater potential importance for national food security than their relative contribution to the nation's food supply would suggest. To underscore the need for a high-quality core veterinary medical education, there was general speculation among those interviewed that an initial agroterrorism attack may occur in small herds or flocks, located near urban areas and most likely serviced by general practitioners. At the other end of the present spectrum of traditional food production veterinarians are those species specialists currently referred to as production medicine veterinarians.

C. Food Systems Veterinarians - The food processing and marketing industries are facing a heightened level of public scrutiny that is international in scope and ranges from animal welfare to food safety. At the same time, food animal production systems have become increasingly complex and are inextricably tied to the processing and marketing segments of the industry. These interrelationships have both private sector and public regulatory components that often may be most appropriately addressed by food systems veterinarians, an emerging subspecialty within veterinary population medicine.

Food systems veterinarians act as arbiters and synthesizers of information across an entire spectrum of activities necessary to assure an abundant and economical supply of wholesome food. Skills that are needed for this field may be acquired through a combination of formal veterinary medical and postgraduate education, coupled with a variety of appropriate professional experiences. Food systems veterinarians often achieve leadership and management roles in integrated livestock operations and throughout the food industry.

D. Number of Veterinarians Needed - Satisfying current projected needs in traditional population health areas of public practice and private practice with a food animal component will require over 500 new entries annually. Available data indicate that approximately 50% of all new graduates initially entering food animal practice exit within five years.⁽⁷⁾ Therefore, it is likely that these projected needs are conservative. Some of these veterinarians, upon leaving food animal practice, may enter public practice and thus remain in a population-health or public-practice career pathway (see Figure 1). However, many, in all probability, will move into companion animal practice and, by doing so, move to another pathway. To maintain the current position, more than 20% of new graduates must initially enter population health or public practice fields upon graduation. If fewer new graduates enter these fields, societal demand will have to be met through the employment of either non-veterinarians or foreign-trained veterinarians.

If our colleges continue to focus solely on addressing the needs currently projected for veterinarians in the traditional areas of population health in either public or private practice, the result may be lost opportunities for the veterinary profession, as well as for society. A scientifically sound veterinary medical education, coupled with postgraduate training and/or experience, will enable veterinarians to enter public or private sector positions that would benefit from the profession's essential linking of agriculture with public health. However, for the profession to expand into those additional areas of population health, for which it is so incomparably qualified, either a larger number of students must be trained or some internal reallocation must occur.



2. Recruitment and Retention

If current and projected veterinary needs in population health and public practice are to be met, there must be:

- a) additional students recruited to the field, either prior to or after they enter veterinary medical college
- b) more students retained in this career pathway while they are in the program
- c) more veterinarians remaining in or shifting to this career pathway early in their careers
- d) some combination of the above

A. Applicant Pool - While students applying to veterinary medical programs remain highly qualified academically, the present applicant pool may lack the diversity of interest necessary for the profession to meet the full range of societal needs. Up to 30% of students entering veterinary medical colleges in the United States express an interest in food animal or public health practice.⁽⁸⁾ Available

evidence suggests that retention of all interested students throughout their four-year veterinary programs may not even meet current national needs let alone the expanding future demands for veterinarians in these fields. Furthermore, we have now reached the point where the demographics of the general population make it less likely that those entering the professional curriculum will have significant prior exposure to either private or public fields of population health. Several colleges are attempting to include or reserve places for students who, in light of their previous documented experience or education, have a higher probability of entering either food animal or public health practice after graduation. Admitting a more diverse group, on the basis of background and/or probable career pathway, should improve the core veterinary educational experience of entire classes. To better match the limited educational resources of the colleges with the full range of critical societal needs in population health and public practice, the following are recommended:

Recommendations

1. There must be a conscious and concerted effort by the AAVMC membership to have veterinary faculty, state associations, species-oriented professional groups, and state and federal agencies more closely involved with pre-veterinary and veterinary students. The many and diverse career opportunities that are available should be highlighted through career-survey courses. Faculty committed to these concepts need to be encouraged to become involved in these important mentoring roles. Faculty performing with excellence in these mentoring capacities must be rewarded.
2. The definition of the professional experience required by the admissions process must be broadened. Experience should not be limited to traditional private practice. Moreover, the question posed should not be, Why do you want to be a veterinarian? but rather, How do you propose to use your veterinary medical degree?⁽⁹⁾
3. Because public funds are used to support veterinary medical instruction, the general good and long-term needs of society must be considered in the admissions process. The admissions process, the gateway to the profession, represents a heavy responsibility, and the colleges must assume leadership and ultimately be held accountable for how they perform this task. At least for the short term, the distribution of veterinarians across the range of functions needed appears to be affected by a complex array of factors, many of which are not fully understood and not necessarily related to the ordinary forces of the free market. For an interim period, or until supply and demand are determined to be more closely in balance, adjustments should be made in the admissions process as may be required for the benefit of the entire public.
4. The AAVMC should assume a leadership role in seeking scholarships and loan forgiveness for students entering underserved fields. An example that works, and that could be adapted for other applications in both public and private sectors of population health, is the US Army Health Professions Scholarship Program, used for recruitment by the Army Veterinary Corps.

B. Retention While in School - There is some evidence that formal curricular and summer cocurricular experiences influence students in selecting the type of practice they ultimately enter.⁽¹⁰⁾ While there is wide variation among US veterinary medical colleges in the delivery of curriculum, some of which is related to the resources that are available to particular colleges, it is clear that the clinical experience is a unique feature of professional veterinary medical education. The need to provide excellence in the clinical experience is also the major factor limiting the number of students who can be admitted to veterinary colleges.

In nearly all veterinary medical education programs, the majority of the companion animal clinical experience can be gained in the veterinary teaching hospital (VTH). Clinical experiences in food animal population health and public health are also essential components of a core veterinary medical education. The challenge facing most colleges is to offer clinical experience in population and public health with a breadth and depth that matches the excellence of the companion animal clinical experience. The VTH has not been the ideal place to provide a complete and meaningful public health learning experience, and changes in the food animal production industries have made the VTH a less than ideal option for providing a complete experience in food animal population medicine.

Recommendations

1. **Role models and rewards**-Faculty and non-faculty role models, active student clubs advised by committed faculty, and planned college-initiated cocurricular activities are needed. Faculty who are involved in these activities should be evaluated and rewarded for innovation and excellent performance. Furthermore, clinical teaching in its broader sense (to include learning experiences not taught in the VTH) should be rewarded equitably.
2. **Tracking**-Many, if not most, curricula have evolved into some sort of tracking, whether or not it is identified as such. A fundamental challenge and requirement in college teaching programs is the identification, maintenance, and strengthening of those core learning experiences that define a basic veterinary education. The AAVMC should commission longitudinal studies to determine, among other things, whether more formal tracking systems result in greater retention in particular career pathways and how career satisfaction among students completing tracking programs compares with that of those trained in more traditional programs.

C. Retention in Career - In terms of both direct costs and opportunity costs, a professional veterinary medical education is expensive for the individual student and for society. Many veterinarians change positions several times during a career. Therefore, a goal in the professional curriculum beyond offering a basic core education should be to inculcate a career pathway mindset in our students. Oftentimes, an individual's career may include transition from private practice to public practice but still remain within the same pathway. Although it seems unlikely that many companion animal practitioners will move into food animal practice, many may eventually move into careers in public practice. Many employers of public practitioners (e.g., Department of Defense (DoD), USDA Agricultural Research Service [ARS], USDA-FSIS, USDA Animal and Plant Health Inspection Service [APHIS], Food and Drug Administration—Center for Veterinary Medicine [FDA-CVM]) routinely seek graduates in the one-to-five year window after graduation. Federal employers are also creating incentives, financial and other, to attract and retain valued veterinary employees.

Currently, many new graduates entering private food animal practice exit after a few years. In some cases, this could actually be healthy. That is, as they develop new professional and life skills in private practice, some veterinarians will want to transition along a career pathway. However, in probably too many cases, such movement may be related to lack of job satisfaction, poor working conditions, or economics.

Recommendations

1. The veterinary medical colleges should implement a program of professional career development in the curriculum. A goal should be to instill in students the concept of developing career pathways.
2. The economic benchmarking tools developed by the National Commission on Veterinary Economic Issues (NCVEI) should be adapted for food animal practice. Initial evidence indicates that these programs are having a positive impact on income in companion animal practice.
3. Salaries in several federal and state agencies are well below the levels necessary to attract and retain highly qualified professionals. Over the long term, failure to place and retain qualified veterinarians in such positions will have deleterious effects on our nation's food safety, food security, and public health. The AAVMC should join with other organizations to encourage private and public sector employers to adapt successful, innovative recruitment and retention models to their own situation. A recent excellent example that goes beyond salary is the agreement between USDA-FSIS and the United States Public Health Service (USPHS) that provides the career pathway opportunities of USPHS to veterinarians working in USDA-FSIS.

3. Education/Training Programs

A. Professional Veterinary Curriculum - The single, unique function of veterinary medical colleges is to provide a professional education leading to the DVM (VMD) degree.⁽¹¹⁾ Currently, approximately 2,400 students graduate each year from the 28 accredited colleges and schools of veterinary medicine in the US. Another 230 US citizens are enrolled in AVMA-accredited foreign schools. Over the last 30 years, as the number of clinical specialties has increased, compression of the core curriculum has occurred. This appears especially true of those courses that relate to the population and public health aspects of the profession. Erosion of such course offerings has varied among US colleges but has generally occurred to a much greater extent in North America than in much of the rest of the world. For example, epidemiology, preventive medicine, and public health core course offerings range from 30 to 120 contact hours among the 28 US colleges.⁽¹²⁾

Recommendations

1. In addition to a core course(s) in epidemiology, colleges should provide at least one required, stand-alone, core, didactic (or problem-solving) course in public health / population medicine. College faculty and administration also need to ensure that mentoring programs are developed that include population health and public practice. Furthermore, students should be exposed to role models in population health and public practice early in their academic careers.
2. A significant strength of North American veterinary medical education is the clinical experience. This experience enables students to problem-solve and tie together concepts presented in classes and laboratories during the initial years. At its very best, the clinical year is the key component in what makes a professional veterinary education unique. Colleges need to provide a clinical-year core experience in population health and public practice. This experience may be in the form of tracking, with core and elective rotations, or in the form of a required clinical rotation. By its very nature, this experience cannot be taught in the VTH. Several colleges already have excellent programs that appear to engage students effectively in experiential learning in population health and public practice. Examples include government and corporate rotation experiences and faculty-led, international, problem-solving study trips to developing countries.
3. For students desiring to enter production medicine practice and perhaps public practice, most colleges will not be able to provide a full range of clinical experiences. There is a need to develop regional alliances to create shared learning opportunities. Most such programs initiated as a result of the Pew study did not include a plan for sustainability and thus no longer exist. Mechanisms such as USDA Higher Education Challenge Grants can be used to provide an incentive for developing regional or national curricular programs, with the requirement that the programs include provisions to be financially self-sustaining after grant funds are expended.
4. Students are frequently taught that veterinarians are members of a team in population health and public practice. Courses need to demonstrate collaboration by including others in the delivery of the curriculum, such as regular and adjunct faculty from the animal sciences, schools of public health, and industry.

B. Practitioner Specialty Training - MPH - Existing and new positions are available for veterinarians with training from Master of Public Health (MPH) programs. Such training could potentiate the education already received in DVM programs and might have the additional benefit of making recipient veterinarians more competitive for numerous non-traditional positions. MPH degrees are currently available in veterinary colleges as dual degree programs, as distance education programs, and as executive programs. Distance education, together with summer institutes and executive programs, fits well with the concept of regionalization of resources among colleges.

Laboratory animal medicine - There are currently 38 ACLAM-approved residency training programs in the US that provide specialty training in laboratory animal medicine. Because of documented, critical needs in biomedical research and impending retirements of board-certified specialists, the current number of trainees could be doubled for at least ten years without creating a surplus.⁽¹³⁾ The national need appears to be great enough to seek reinstatement of previously successful, NIH-funded training programs.

Other non-thesis MS programs - Veterinary medical education provides an excellent foundation for numerous private and public careers that require a basis in biomedical science and problem solving. Additional training, such as is currently available in food systems, food safety, business administration, and public administration, would seem synergistic to the DVM (VMD) degree. A postgraduate learning program that includes veterinarians studying with other professionals is beneficial to both groups and, at the same time, introduces others to the full range of capabilities of veterinarians.

Recommendations

1. Colleges must make students in the professional curriculum aware of the additional career opportunities available after completing an advanced program of study, such as MPH, ACLAM residency, or other practitioner specialty certification in

population health and public practice.

2. Colleges should develop regional or national partnerships to provide specialty training in population health or public practice.
3. The AAVMC should seek NIH support to fund training for veterinarians in programs that address critical biomedical research needs for laboratory animal medicine.

C. Research and Graduate Education - The research mission is an important—in some ways, the most important—mission of veterinary colleges.¹¹ An added bonus of conducting funded research in veterinary colleges is the graduate education opportunities for veterinarians that such programs provide. Veterinarians trained in postgraduate MS and PhD research programs have many advantages over other scientists, as a result of the multispecies, comparative medicine training inherent in their professional education. Federal agencies such as USDA and Health and Human Services (HHS) recognize the breadth and value that veterinarians bring to a research team. In the past decade many infectious zoonotic diseases (e.g., Nipah virus, Hanta virus, West Nile virus, E. coli O157:H7, monkeypox, BSE) have emerged as a result of changes in ecosystems and production systems. In addition to traditional research involving production animals and biomedical research using animal models, veterinarians have a distinct advantage because of their understanding of species epidemiology and the ecology of zoonotic infections. A coordinated national effort to build the infrastructure necessary to support research and graduate education is urgently needed.

The current admissions process for veterinary students, the emphasis in the curriculum on companion animal medicine, the lack of faculty role models, and the perception that great financial rewards are available in companion animal clinical specialties, together with low graduate student stipends, have resulted in too few American veterinarians being trained to the PhD level in non-clinical academic fields, such as epidemiology, pathology, and infectious diseases. For pathology, there is an additional concern because shortages (projected deficit of 17–55 pathologists per year through 2007) exist both for those trained for traditional anatomic diagnostic work and for those trained to work in industry.⁽¹⁴⁾ The training and career pathways for these pathologists have some inherent differences. Over time, the veterinary medical colleges have tended to self-select in the focus of their training programs. In many respects, a portion of the training required for diagnostic pathologists is similar to that of veterinarians trained in the population-health techniques of production medicine.

Failure to educate adequate numbers of veterinarians as PhD scientists will adversely affect national food security and public health. Because of a lack of faculty role models, the situation has become self-perpetuating. The replacement of retiring faculty with non-veterinary PhDs will affect the teaching and research perspectives now offered by DVM-PhDs. In many areas of animal health, simple replacement needs do not require great numbers of DVM, PhD-level scientists (e.g., 10–20 avian infectious-disease specialists over the next 5–10 years); but even these modest needs are not currently being met.⁽¹⁵⁾

Recommendations

1. The AAVMC should continue to seek support for the National Academy of Sciences study, designed to identify national needs for research in veterinary science.
2. Competitive stipends of at least \$35,000 per year plus tuition need to be offered to highly qualified US veterinarians for graduate studies in epidemiology, pathology, and infectious diseases. USDA and NIH should assist in this endeavor.
3. There is a great, synergistic advantage in a cohort of students being trained within a given graduate program. Therefore, in certain cases, regional or national centers should be funded through a competitive process, with awards based on area of emphasis and excellence.

D. Retooling - Colleges should be more involved in meeting the educational needs of their graduates after graduation. While a common goal is to instill a commitment to lifelong learning in their graduates, too often, colleges do not follow through as providers of meaningful lifelong education. Moreover, colleges should make efforts to develop postgraduate educational opportunities that are realistically within reach of working veterinarians. There is a need to instill in our students, while they are in professional school, an awareness of the many educational opportunities available after they get some practical experience.

Recommendations

1. Colleges, often on a regional basis, should develop certificate (non-degree) programs, designed to enable veterinary medical graduates to develop more marketable skills. Examples include the Dairy Production Medicine Certificate Programs conducted by several universities. A follow-up progression that has implications for national food security and safety would be a certificate program for food systems veterinarians.
2. Each college should create an awareness that a value-added career (career pathway), such as that of a food systems veterinarian (either in private practice or employed by government or business) is a step that some graduates might seek, either with or without experience in traditional production medicine. This same logic could be applied to other careers in public health.

INVESTMENT NEEDED

The veterinary medical profession and veterinary academy have changed markedly since the first, publicly supported, US college of veterinary medicine was founded in 1879. Since that time, many challenges have been addressed, and both animal and public health systems have benefited from veterinary involvement. However, many new challenges remain. Arguably, the impact that the veterinary colleges and the profession have had on the fields of population health and public practice is greater than the number of veterinarians involved in those fields would suggest. Further serious and sustained effort to support the resources and infrastructure of veterinary medical education will be required if the United States is to maintain many of its comparative advantages among the world's nations.

National needs in food security, food safety, and public health require national solutions. Canada, our largest international trading partner, has recognized this and its federal government has formed partnerships with the provinces to improve the infrastructure of

the four Canadian veterinary schools. The leadership of the member colleges of the AAVMC recognizes the critical nature of the time in which we live. Reasoned decisions must be made, or many opportunities for meeting our nation's needs will be lost, to the great disadvantage not only of the veterinary profession, but of society in general. For the well-being of the nation, developing and maintaining the infrastructure required for professional and postgraduate veterinary education and research in population health and public health must be a top priority. Because these issues are of national importance, they are most appropriately addressed through a collective effort or partnership between our veterinary colleges and departments, on the one hand, and government, at both the state and federal levels, on the other.

Resources will always be limited. The AAVMC leadership accepts that part of the solution lies in the way scarce state monies are allocated within their respective colleges. However, for the partnership to truly work, additional investment will be required from the federal government and all of the states, including those without veterinary medical colleges. Strategic development and better utilization of the veterinary medical educational establishment can provide, for the benefit of all Americans, a critical link between agriculture and human medicine. Further development, together with shared responsibility and accountability, will optimize national efforts to meet needs in food safety and security, public health, animal health, and comparative medicine.

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3. United States Department of Health and Human Services, Food and Drug Administration, Center for Veterinary Medicine, FDA-V00062-00-03-GH-00

Selected Faculty and Administrators from Colleges and Departments of AAVMC Member Institutions

University of California–Davis	Mississippi State University	Stanford University
Colorado State University	North Carolina State University	Texas A & M University
University of Georgia	The Ohio State University	Tufts University
Iowa State University	University of Pennsylvania	Virginia-Maryland
Michigan State University	University of Prince Edward Island	
University of Minnesota	Purdue University	

Selected Personnel from the Following Government Agencies and Professional Organizations

American Association of Laboratory Animal Science
 American College of Laboratory Animal Medicine
 American Veterinary Medical Association, Government Relations Division
 National Association of Federal Veterinarians
 United States Department of Agriculture
 Agricultural Research Service; Animal and Plant Health Inspection Service, Veterinary Services;
 Cooperative State Research, Education and Extension Service; Food Safety and Inspection Service
 United States Department of Defense
 US Army Veterinary Corps; US Air Force Biomedical Sciences Corps
 United States Department of Health and Human Services
 NIH—National Center for Research Resources; NIH—National Institute for Allergy and Infectious Diseases; United States Public Health Service

Symposia

Challenges for Population Health Education, University of California-Davis, Davis, CA, May 2002; Food Animal Veterinarians: An Endangered Species, Kansas State University, Manhattan, KS, October 2002; The Role of Veterinary Medicine in Biodefense and Public Health, AAVMC, Washington, DC, November 2002

Task Force Reports

Emergency Needs in Veterinary Human Resources, AAVMC Task Force, Washington, DC, April 2003

REFERENCES

1. United Nations Population Division. World Population Prospects: The 2002 Revision Population Database <<http://esa.un.org/unpp>>. Accessed 9/22/03. United Nations, 2003.
2. Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction. Fourth Annual Report to the President and the Congress: Implementing the Strategy <http://www.securitymanagement.com/library/Gilmore_terrorreport1202.pdf>. Accessed 09/03/03. Advisory Panel, Washington, DC,

2002.

3. AVMA Membership Directory and Resource Manual. Schaumburg, IL: American Veterinary Medical Association, 2003.
4. Buntain B. Personal communication.
5. Altekruze S. Personal communication.
6. Fournier J. Personal communication.
7. Osborne D. Demographic survey forecast. Focus (Ontario Veterinary Medical Association) 22:16-17, 2003.
8. Elmore RG. Recruitment and retention of veterinary students for food animal practices. J Am Vet Med Assoc 222:1697-1699, 2003.
9. Asem E. Personal communication.
10. Dewey CE, Leyenaar JK, Straw B. The influence of swine-related work experience as career choice following graduation. J Vet Med Educ 27:28-32, 2000.
11. Pritchard WR. Future Directions for Veterinary Medicine. Durham, NC: Pew National Veterinary Education Program, 1989.
12. Riddle C, Mainzer H. Training the veterinary public health workforce: A review of educational opportunities in United States Veterinary Schools. J Vet Med Educ (forthcoming).
13. Balk M. Personal communication.
14. Survey Research Laboratory, University of Illinois at Chicago. Veterinary Pathologist Survey: Final Report, July 2002. American College of Veterinary Pathologists, Middleton, WI, 2002 p25-28.
15. Eckroade R. Personal communication.

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project PENNSYLVANIA Campaign

The veterinary profession is at a critical point. According to the Association of American Veterinary Medical Colleges (AAVMC), urbanization and affluence have led to increased demands for companion animal veterinary care. At the same time, critical national needs in public health, food safety, biosecurity, animal health, and comparative medicine continue to increase at an alarming rate. However, there is a growing shortage of veterinarians nationwide. This identified veterinary shortage and the projected increased need in public health indicate that in 20 years, there will be a shortage of 15,000 veterinarians. In addition, the nation could face a shortage of as many as 4,000 veterinarians in the next six years if current trends continue according to a recent study based on data from the US Bureau of Labor Statistics. It is also estimated by the American Veterinary Medical Association (AVMA) that only approximately 17 percent of veterinarians work in food supply, which includes private and public practice veterinarians involved in the entire food chain from farm to fork. Research forecasts a shortfall of four to five percent per year in the ranks of food supply veterinarians.

Another major problem lies in the realm of starting salaries, especially those of food animal veterinarians. According to statistics provided by the American Veterinary Medical Association, new veterinary graduates face an average of \$106,000 in debt after finishing school (Penn's veterinary students have an average debt load of \$160,000 upon graduation), while they can only expect a baseline starting salary of about \$55,000 in food animal medicine and about \$40,000 in equine medicine. This compares to an average baseline starting salary of more than \$61,000 for graduates entering small animal medicine. Faced with considerable debt, many students do not consider careers in these fields.

Now is the time to address this shortage. Veterinarians play a crucial role in protecting Pennsylvania's food supply and public health and are the first line of defense in zoonotic, foreign, and emerging diseases and biosecurity. They are the only health professionals trained in multi-species comparative medicine and therefore are a distinctive asset to Pennsylvania.

The veterinary and agricultural communities in Pennsylvania have expressed concerns about the shortage of veterinarians available to care for producers' livestock. The biomedical research community has seen shrinking numbers interested in these career paths while needs have increased for comparative medicine research, and



Alarming Stats

- There are 86,000 US veterinarians. That number of individuals would not fill a large football stadium.
- There are 28 US Colleges of Veterinary Medicine in 27 states which graduate approximately 2,600 veterinarians annually.
- The identified veterinary shortage and projected increased needs in public health indicate that in 20 years, there will be a shortage of 15,000 veterinarians. To meet this demand for more veterinarians, a 20% expansion of enrollment and additional facilities at current institutions are needed.
- Between 1-2% of the veterinary profession is actually involved in public health in terms of position description.
- 20% of all US veterinarians are employed in population health, either in public practice or private practice with a food animal component.
- At the same time, 75% of the new emerging diseases in people actually come from or through animals.
- 80% of bioterrorist agents that we are aware of are zoonotic agents.
- The number of veterinarians available to serve society in key roles related to food safety, public health, and biosecurity does not meet demand and a recent study projects this shortage to worsen by 4% annually for the next ten years.
- Only 27 states currently bear the cost of producing the veterinarians who protect the entire nation's food supply and public health. Food animal production generates \$124 billion annually to the US economy. The health of these valuable animals is protected by veterinarians. A single, highly infectious disease that is not rapidly diagnosed could destroy much of our livestock, resulting in shortages of dietary proteins and significant economic losses.

state and federal agencies face similar challenges recruiting veterinarians to fill crucial roles in biosecurity, public health, and food safety. Now is the time to partner together to make a difference.

Top 4 Solutions to the Shortage of Veterinarians to Work Toward During the Campaign

1. Increasing economic incentives to go into and stay in their selected field
2. Increasing job satisfaction
3. Recruiting individuals for these positions
4. Educating the public and increasing awareness

Potential Strategies for Each Solution

1. Increasing Economic Incentives

- Increasing the average starting salaries of those areas of veterinary medicine to be more in line with companion animal practice and increasing the remuneration for students entering into the workforce across all career paths.
- Development of a Loan Forgiveness Program for Pennsylvania that will guarantee approximately \$20,000 per year for four years for students who pursue careers in under served areas of veterinary medicine.
- Subsidizing educational costs through no interest loans provided by industry and the possibility of debt forgiveness if the student stays employed with the company for an agreed upon length of time upon graduation.
- Training for veterinarians in their chosen fields that allows them to market themselves better and makes them more valuable to their clients.
- Expansion of the veterinary team workforce to grow the number of CVTs interested in underserved areas and utilization of these CVTs to do tasks that are permitted under the supervision of a veterinarian.
- Subsidizing education through tax relief incentives.
- Subsidizing educational costs through scholarship opportunities.

2. Increasing Job Satisfaction

- Developing a solution to emergency coverage in production animal medicine through possible cooperative agreements between practices and other avenues.
- Identifying other areas of concern related to overall job satisfaction through surveying of the profession and focus groups.
- Providing mentor opportunities for recent graduates on the job to provide a source of support for questions, challenges, and concerns they have.
- Providing some type of support network for veterinarians in these underserved areas to offer suggestions and input.
- Educating clients about the importance of positive feedback about how the veterinarian impacts their farm, herd, etc.

3. Recruiting Individuals For These Positions

- Promoting opportunities at schools to highlight veterinary careers—partnering veterinarians and veterinary students with schools to help get school-age children (fifth grade and older) psyched about careers in veterinary medicine.
- Developing a “one stop shop” veterinary career website.

- Providing mentor opportunities for pre-vet and animal science students at Penn State.
- Increasing the class size at Penn Vet and designating seats for students with interests in underserved areas of veterinary medicine.
- Providing mentoring opportunities for veterinary students with veterinarians in these areas.

4. Educating the Public and Increasing Awareness

- Developing an educational initiative on the role of veterinarians in food safety, public and animal health, and biosecurity including press releases, website areas, educational brochures, white papers, lesson plans, etc.
- Developing a career website that highlights various veterinary careers, the veterinary team, training and education, and links to resources.
- Developing profiles of veterinarians, stories about the shortage areas for the press. Once a month, put on the career website—the profile of the month.
- Coordinating an editorial board tour.
- Pursuing opportunities to have discussions, interviews, etc., on PCN, Comcast Pets on Demand, and other media outlets.
- Promoting opportunities at schools to highlight veterinary careers—partnering veterinarians and veterinary students with schools to help get students psyched about careers in veterinary medicine.

project PENNSYLVANIA Coalition

The Pennsylvania Veterinary Medical Association is committed to making a difference through its project **PENNSYLVANIA** Campaign. We hope to partner with stakeholder organizations, institutions, and agencies to solve the veterinary shortage. One of the steps will be formation of the project **PENNSYLVANIA** Coalition. This Coalition is working together to speak with a unified voice on the problem and possible solutions when working with the veterinary community, agribusinesses, industry, legislators, and the public.

Coalition Members as of March 2010

Pennsylvania Veterinary Medical Association
PennAg Industries Association
Pennsylvania Society for Biomedical Research
University of Pennsylvania, School of Veterinary Medicine
Pennsylvania Farm Bureau
Pennsylvania State Grange
Pennsylvania Dairy Stakeholders Group
Pennsylvania Beef Council
Center For Dairy Excellence

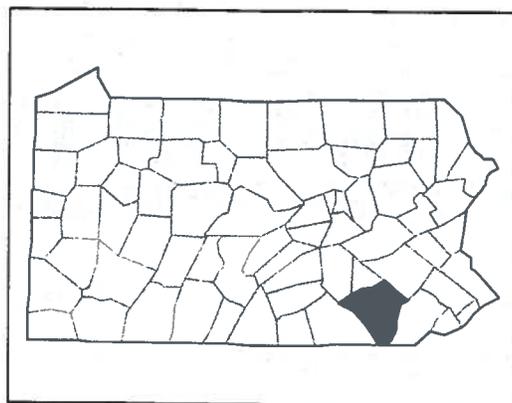
Next Steps

- Educate the public and legislature about the shortage.
- Identify a bill sponsor and move forward with legislative initiative to provide \$20,000 per year in loan forgiveness for up to five years for veterinarians in public sector veterinary medicine.

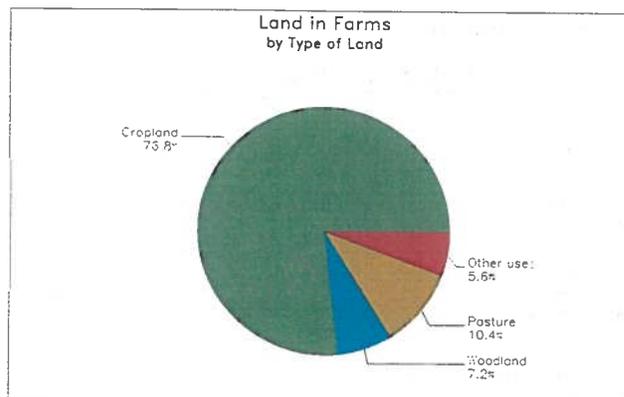
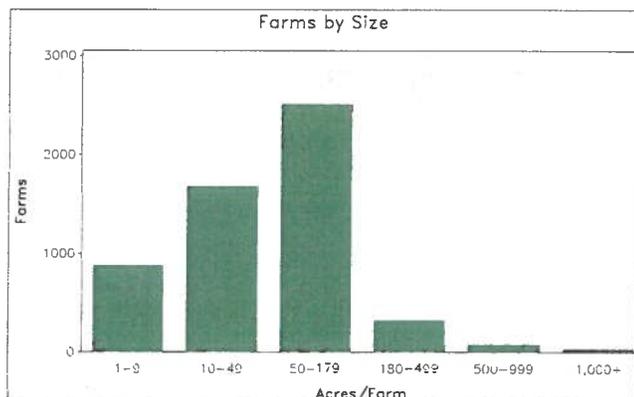
2007 CENSUS OF AGRICULTURE

County Profile

Lancaster County Pennsylvania



	2007	2002	% change
Number of Farms	5,462	5,293	+ 3
Land in Farms	425,336 acres	411,848 acres	+ 3
Average Size of Farm	78 acres	78 acres	0
Market Value of Products Sold	\$1,072,151,000	\$798,346,000	+ 34
Crop Sales \$149,254,000 (14 percent)			
Livestock Sales \$922,896,000 (86 percent)			
Average Per Farm	\$196,293	\$150,831	+ 30
Government Payments	\$4,547,000	\$6,846,000	- 34
Average Per Farm Receiving Payments	\$3,617	\$11,316	- 68



2007 CENSUS OF AGRICULTURE

County Profile

Lancaster County – Pennsylvania

Ranked items among the 67 state counties and 3,079 U.S. counties, 2007

Item	Quantity	State Rank	Universe ¹	U.S. Rank	Universe ¹
MARKET VALUE OF AGRICULTURAL PRODUCTS SOLD (\$1,000)					
Total value of agricultural products sold	1,072,151	1	67	18	3,076
Value of crops including nursery and greenhouse	149,254	3	67	164	3,072
Value of livestock, poultry, and their products	922,896	1	67	10	3,069
VALUE OF SALES BY COMMODITY GROUP (\$1,000)					
Grains, oilseeds, dry beans, and dry peas	60,097	1	67	492	2,933
Tobacco	22,004	1	19	10	437
Cotton and cottonseed	-	-	-	-	626
Vegetables, melons, potatoes, and sweet potatoes	19,030	1	67	116	2,796
Fruits, tree nuts, and berries	6,651	5	66	166	2,659
Nursery, greenhouse, floriculture, and sod	34,055	5	65	98	2,703
Cut Christmas trees and short rotation woody crops	604	8	66	75	1,710
Other crops and hay	6,813	3	66	242	3,054
Poultry and eggs	303,043	1	67	16	3,020
Cattle and calves	122,624	1	67	75	3,054
Milk and other dairy products from cows	387,224	1	65	10	2,493
Hogs and pigs	103,331	1	66	29	2,922
Sheep, goats, and their products	866	1	66	139	2,998
Horses, ponies, mules, burros, and donkeys	3,399	3	67	42	3,024
Aquaculture	282	29	59	460	1,498
Other animals and other animal products	2,128	3	67	84	2,875
TOP CROP ITEMS (acres)					
Corn for grain	101,981	1	66	275	2,634
Forage - land used for all hay and haylage, grass silage, and greenchop	84,366	2	67	67	3,060
Corn for silage	68,238	1	64	3	2,263
Soybeans for beans	30,673	2	61	682	2,039
Wheat for grain, all	11,763	2	60	650	2,481
TOP LIVESTOCK INVENTORY ITEMS (number)					
Broilers and other meat-type chickens	10,730,905	1	62	26	2,476
Layers	7,086,263	1	67	4	3,024
Pullets for laying flock replacement	2,199,999	1	65	3	2,627
Hogs and pigs	355,023	1	66	30	2,958
Cattle and calves	270,577	1	67	20	3,060

Other County Highlights

Economic Characteristics	Quantity	Operator Characteristics	Quantity
Farms by value of sales:			
Less than \$1,000	775	Principal operators by primary occupation:	
\$1,000 to \$2,499	270	Farming	3,501
\$2,500 to \$4,999	322	Other	1,961
\$5,000 to \$9,999	298	Principal operators by sex:	
\$10,000 to \$19,999	305	Male	5,065
\$20,000 to \$24,999	132	Female	397
\$25,000 to \$39,999	300	Average age of principal operator (years)	
\$40,000 to \$49,999	151		47.7
\$50,000 to \$99,999	492	All operators by race ² :	
\$100,000 to \$249,999	1,548	American Indian or Alaska Native	20
\$250,000 to \$499,999	435	Asian	4
\$500,000 or more	434	Black or African American	-
Total farm production expenses (\$1,000)	805,697	Native Hawaiian or Other Pacific Islander	-
Average per farm (\$)	147,509	White	7,785
Net cash farm income of operation (\$1,000)	295,850	More than one race	17
Average per farm (\$)	54,165	All operators of Spanish, Hispanic, or Latino Origin ²	39

See "Census of Agriculture, Volume 1, Geographic Area Series" for complete footnotes, explanations, definitions, and methodology.

(D) Cannot be disclosed. (Z) Less than half of the unit shown.

¹ Universe is number of counties in state or U.S. with item. ² Data were collected for a maximum of three operators per farm.

Pennsylvania Alliance for Livestock Care and Well-Being



Pennsylvania Alliance for Livestock Care and Well-Being (PALCWB)

Mission Statement

The Pennsylvania Alliance for Livestock Care and Well-Being is a private-public partnership of individuals, organizations and state agencies working together for animal well-being and food safety.

Why We Were Formed

The Pennsylvania Alliance for Livestock Care and Well-Being was established in 2009 by the Pennsylvania Veterinary Medical Association (PVMA). It is comprised of key stakeholder organizations and agencies in the agricultural, educational, and biomedical communities to ensure best practices in livestock care and well-being from the farm to the supermarket in Pennsylvania. In our state, animal agriculture generates approximately \$3.94 billion in direct sales of animals and animal products and \$45 billion in total economic influence for the Commonwealth annually. Therefore, an investment in the well-being of the animals not only benefits Pennsylvania's economy by providing wholesome, safe, and affordable food to the market, but is an essential practice which contributes to the wellness of the Commonwealth's citizens.

The veterinary and agricultural communities have joined together to address proactively issues related to the well-being of the animals involved in agriculture and to educate the public about modern agricultural practices. Our collective experience, expertise, and our common vested interest makes the Alliance an effective means of ensuring that livestock well-being considerations are paramount in agricultural best practices, that the public understands these best practices in terms of how their food is produced, and humane treatment of animals is assured. Consistent standards for optimal livestock care and well-being are essential to a safe, high-quality and affordable food supply, not only for Pennsylvania, but for the global population as a whole. Our key areas of focus are:

1. Education/Public Outreach
2. Legislative Advocacy
3. Industry Excellence

Our Guiding Principle

PALCWB is guided by a desire to establish Pennsylvania as a leader and trusted source for quality, safe, and nutritious food from farms implementing highest standards of livestock care and well-being.

Core Values

Our core values are:

Accountability—To present a unified voice of expertise on incidents related to animal care and well-being and food safety—condemning what is unacceptable, validating appropriate practices, and educating producers on what practices are appropriate and why;

Integrity—Ensure honest and responsible decision-making and actions;

Initiative—Have a proactive approach to animal well-being and food safety;

Inclusivity—Ensure accessibility and representation of the common interests of all stakeholders; and

Commitment—Demonstrated by common purpose and shared values in the promotion and implementation of the highest standards of animal care and well-being.



Our Objectives

Our objectives as an Alliance are to:

- Proactively promote and ensure appropriate standards of livestock care, well-being, and food safety.
- Become the trusted source for safe, quality and nutritious food from farms implementing the highest standards of animal care and well-being.

Goals for the Next Two Years

1. To obtain participation of all livestock producers in a qualifying animal care and well-being program.
2. To educate the public as to why livestock producers care about the well-being of their animals and consumer safety.
3. To be a unified voice on proposed legislation regarding livestock care, animal well-being and food safety.
4. To provide a forum where all stakeholders are encouraged to participate in the development of livestock care, animal well-being and food safety standards.

Becoming an Alliance Partner

The Alliance for Livestock Care and Well-Being encourages livestock species and agricultural organizations to consider joining PALCWB. Together we can make a difference in the care and well-being of livestock animals here in Pennsylvania. For information on becoming a member organization, contact Charlene Wandzilak, Executive Director, Pennsylvania Veterinary Medical Association at cwandzilak@pavma.org or 717.220.1437.

Partners

- Beef Quality Assurance Commission
- Center for Beef Excellence
- Center for Dairy Excellence
- Federated Humane Societies of Pennsylvania
- PennAg Industries Association
- Pennsylvania Beef Council
- Pennsylvania Cattlemen's Association
- Pennsylvania Dairy Stakeholders
- Pennsylvania Department of Agriculture, Bureau of Animal Health and Diagnostic Services
- Pennsylvania Farm Bureau
- Pennsylvania Livestock Association
- Pennsylvania Society for Biomedical Research
- Pennsylvania State Grange
- The Pennsylvania State University, College of Agricultural Sciences
- Pennsylvania Veal Producer's Association
- Pennsylvania Veterinary Medical Association
- University of Pennsylvania, School of Veterinary Medicine