Emerging Challenges in Public Health Protection, Food Safety, and Security: Veterinary Needs in the USDA’s Food Safety and Inspection Service

Bonnie J. Buntain

ABSTRACT
Meeting the needs of public service practice is a responsibility of the veterinary profession. The United States Department of Agriculture (USDA) Food Safety and Inspection Service (FSIS) has undergone significant change since 1996, when the final rule on Pathogen Reduction and Hazard Analysis and Critical Control Point (HACCP) Systems and its regulations were published in response to food-borne illnesses and deaths due to *E. coli* 0157:H7 in undercooked hamburgers. As a result, the role of the veterinarian is changing from a focus on carcass inspection (reactive) to scientific-based systems analysis and enforcement (preventive). With a large pool of veterinarians eligible to retire, a critical shortage of field veterinarians is predicted. The purpose of this article is to raise educators’ awareness of this need, of the competencies required, and of the challenges and opportunities for veterinarians in the new public health–focused FSIS. An invitation to collaborate with the agency is offered to help meet emerging workforce requirements in public health practice.

BACKGROUND
For more than 100 years, public practice veterinarians have been responsible for eradicating significant zoonotic diseases from food animals. Veterinary medical officers employed by governments have protected public health through ante- and post-mortem inspection of livestock and poultry for animal diseases and conditions, quality, and other consumer protection concerns, as well as ensuring humane handling and slaughter of livestock. For the first 100 years of the history of food animal inspection, the official stamp of the US Department of Agriculture (USDA) on meat and poultry products primarily indicated grading and quality of meat. Veterinarians spent most of their time inspecting carcasses, examining for foreign animal diseases, and removing unfit animals with diseases and unacceptable conditions that might lead to food-borne diseases. An internal evaluation of Food Safety and Inspection Service (FSIS) veterinary disposition regulations, conducted in 2004, concluded that only approximately 13% of the regulated food animal diseases and conditions requiring veterinary disposition are of any significant food-borne public health concern.

A watershed event in the history of public health protection occurred in 1993 with the tragic deaths of three children in Washington state and 600 reported illnesses due to an emerging food-borne pathogen, *E. coli* 0157:H7, in hamburgers. It became clear to the public that the USDA mark of inspection and industry production practices had failed to acceptably address microbial food-borne pathogens to the extent necessary to protect consumers. The emergence of previously unrecognized pathogens, as well as new trends in food distribution and consumption, highlighted the need for new strategies to reduce the health risks associated with pathogenic microorganisms in meat, poultry, and egg products. As a result, Congress reorganized the USDA. All food safety efforts for meat, poultry and egg products were concentrated in one agency, the Food Safety and Inspection Service (FSIS), with a new Under Secretary for Food Safety reporting directly to the Secretary of Agriculture. In 1996, the FSIS promulgated new regulations to address food-borne microbial, physical, and chemical hazards that may occur before, during, or after meat and poultry food processing. For the first time in USDA history, the Pathogen Reduction and Hazard Analysis and Critical Control Point (HACCP) Systems Final Rule made industry responsible for food safety by requiring implementation of preventive processing practices that control unseen public health hazards in meat and poultry products. With this rule, the role of the veterinarian changed forever, from an official who told industry what to do and how to do it to one who uses scientific and critical thinking skills to oversee, verify, and enforce rules ensuring that industry pathogen reduction HACCP and sanitation systems are operating in accordance with the regulations and as a result are preventing adulterated products.

In 1996, the FSIS declared for the first time that a food-borne pathogen, *E. coli* 0157:H7, is an adulterant in ground beef. This was based on the determination that routine cooking practices in the United States are generally inadequate to kill this highly virulent and pathogenic organism prior to consumption. FSIS also considers *Salmonella, Listeria*, and *E. coli* 0157:H7 as adulterants in ready-to-eat products (e.g., hot dogs and deli meats) and *E. coli* 0157:H7 an adulterant in beef trimmings. The new role of the FSIS veterinarian now includes analyzing microbial testing results and determining how these pathogens (as well as chemical and biological toxins and physical hazards) enter, disseminate, reproduce, and/or survive under a multitude of live animal, slaughter, and processing procedures and environments. Critical
problem solving and systems thinking is required to analyze industry’s critical control points (CCPs) to determine their scientific validity and adequacy in reducing, eliminating, and controlling food-borne hazards in a wide variety of industrial processing conditions. These skills define a large part of the art and science of veterinary public health protection.

In order to provide a strong public health assurance program, veterinarians must be able to enforce regulations effectively in a litigious environment. For many years we have trained our field force to write specific, point-by-point noncompliance reports (NRs) for each regulatory infringement. As public health assurance practitioners, veterinarians have seen their role evolve from writing a string of NRs to evaluating the totality of regulatory infractions in relation to the history of the establishment’s entire production system. This evaluation includes an epidemiological analysis of many variables: the HACCP systems and testing records from the establishment; production flow and the environment, for potential contamination sources; FSIS verification testing results, including pulse-field gel electrophoresis (PFGE) patterns; consumer complaint patterns related to FSIS-regulated products; information from ongoing food-borne illness outbreaks and investigations; results of corrective actions from noncompliance reports; FSIS verification records; employee practices; and so on. The veterinarian must be able to evaluate the system and determine what recurring problems may be linked, resulting in an adulterated product. If adulteration is possible based on linking the scientific facts, the product or the establishment’s production must be withheld by the agency. The “clinical” case must be written in such a way as to stand up in court. The veterinarian must describe the scientific reasoning that led him or her to declare an imminent public health concern. In order to meet national and international societal needs for expanded public health assurance duties. For the recent graduate (one to five years since graduation), these changes are exciting and challenging, since they fully utilize the entire spectrum of veterinary medical expertise and do not restrict the veterinarian’s duties to ante- and post-mortem pathological dispositions. To better describe the veterinarian’s current roles, the 100-year-old title “Veterinary Medical Officer” is being updated to “Public Health Veterinarian.”

**EMERGING CHANGES IN GLOBAL VETERINARY PUBLIC HEALTH**

National and international concerns regarding the spread of food-borne pathogens and bioterrorism have raised the stakes for us all. These concepts are expertly described in the JVME’s “An Agenda for Action: Veterinary Medicine’s Crucial Role in Public Health and Biodefense and the Obligation of Academic Veterinary Medicine to Respond.” Many countries have studied how the United States developed animal and public health partnerships to meet emerging food-borne disease challenges. For example, the USDA, state Departments of Public Health, and the Department of Health and Human Services’ Centers for Disease Control and Prevention (CDC) have partnered to develop FoodNet and PulseNet. This model of active human health surveillance was created to better determine, through modern microbial epidemiology, the scope of food-borne illnesses and their etiologies. International communities are implementing similar programs to respond to the global spread of food-borne and antimicrobial resistant pathogens, with the assistance of the World Health Organization (WHO), Food and Agriculture Organization (FAO), Codex Alimentarius (the international food code organization), and the Office international des épizooties (OIE, the international animal health organization). In addition, to qualify to export to the United States, foreign countries must demonstrate equivalent food safety systems. HACCP systems and risk analysis have become the framework of international public health preventive programs from farm to table. Consequently, the veterinarian’s role has expanded in the international arena as a critical member of the public health team.

A WHO report on future trends in veterinary public health describes the significant role veterinarians must play in addressing emerging and re-emerging globally significant zoonoses, including BSE, food-borne pathogens, West Nile virus, and new rabies-like viruses in bats in Australia and Europe. Global pandemics arising from mammalian and avian reservoirs, combined with the potential for bioterrorist use of zoonotic agents, have strengthened the case for an international veterinary public health strategy “consistent with the goal of Health for all in the twenty-first century.” In order to meet national and international societal needs for science-based systems control, the veterinary profession must deeply embrace the enormous responsibility of providing a strong educational foundation in the art and science of veterinary public health protection.
ence of public health protection. The USDA needs veterinary professionals who seek these challenges as a career path. The veterinary medical profession must ensure that our graduates have a deepening sense of their responsibilities in the animal/human, one-medicine reality.

CRITICAL VETERINARY RESOURCES AND COMPETENCY NEEDS IN THE USDA FOOD SAFETY AND INSPECTION SERVICE

The USDA currently employs approximately 1,750 veterinarians in the GS-701 Veterinary Medical Officer (VMO) series. FSIS is the largest employer of veterinarians in the United States, with approximately 1,100; most are also in the VMO (GS-701) job series. The range of job vacancies for VMOs is from 40 to approximately 100 at any one time. In 2002 a USDA workforce analysis report projected a loss in the permanent workforce of 594 VMOs. At current hiring rates, a gap of 147 (8.54% of the field force) is projected in 2007. This may be an optimistic gap analysis in light of the current trend of veterinary class demographics and career path interests. An analysis of the agency’s veterinary workforce in 2003 reported that of 57 veterinarians hired, 76% were white, 14% African American, 4% each Asian American and Hispanic, and 2% Native American. Underrepresented groups include white women (12.4%), Hispanic women (0.1% or less), and Asian/Pacific women (0.2%). Since 1999 there has been a continued downward trend of women in the VMO series. There is an urgent need for a pool of recent graduates with an interest in public service.

The USDA analysis of human capital needs and skills defined the veterinary medical series as a “critical occupational series” to accomplishing the department’s mission. The report recognized two types of gaps: the inventory of people required to those currently assigned; and the difference between the skills of the individuals in the series and the competencies they need (in other words, the “USDA may have the right number ... but those people may not have, or at least demonstrate, the right skills to meet the requirements” needed in 2007).

The report describes 13 competencies listed for this series. It states that “continual learning, oral and written communication, and accountability competencies—all had high competency gaps.” The general competency gaps for the GS 701 series include accountability; flexibility/adaptation; integrity/honesty; interpersonal skills; team building; conflict management; continual learning; leadership; oral and written communication; technical credibility; problem solving; managing human resources; and decision making. Specific occupational competency gaps are listed as pathology; interpersonal skills; organizational/prioritization; programmatic knowledge of FSIS processes and procedures, regulatory programs, and so on; self-motivation/self-management; scientific understanding; knowledge of food safety; veterinary skills; and supervisory skills. For each there was a predicted five-year gap for FSIS needs.

Although there is currently an overlap between the expanded public health assurance job duties and the pathological disposition and regulatory enforcement of the past, the agency is committed to fully utilizing veterinary science as the key profession to analyze, verify, and assure public health protection and is strengthening its initiatives to train, recruit, and retain veterinarians committed to public health practice.

USDA-WIDE STRATEGIES FOR ADDRESSING VETERINARY RESOURCE AND COMPETENCY GAPS

The USDA has directed its agencies to include specific strategies for addressing resource and competency gaps, including:

- outreach and marketing to high schools and community organizations, including minority institutions, and professional and academic contacts;
- continuation of the USDA student recruitment program;
- selective use of monetary incentives for recruitment, relocation, and bonuses for referral of candidates;
- student loan repayment options on a limited basis;
- retention programs with a variety of work/life balance features such as flexible work schedules, flexiplace, and reimbursement of child-care expenses; and
- retention allowances for those offered jobs outside the federal government.

In order to help close competency gaps, agencies are instructed to use hiring bonuses, promotions, awards, and employee development and training strategies to improve those specific key competencies.

FSIS STRATEGIES: RECRUITMENT, RETENTION, EDUCATION, TRAINING, AND MENTORING

The FSIS has increased its veterinary recruitment and retention strategies as a result of the critical need for and expanding role of veterinarians. The recommendations of the Blue Ribbon Task Force on the Future of FSIS Veterinarians, published in 2000, have been used as a framework to recruit and retain the best and brightest. The following represent new initiatives in FSIS to better address competency gaps and critical needs for veterinarians.

Recruitment

FSIS is making it clearer that many challenging career pathways are available. A new recruitment video, the Web page “Veterinary Careers,” and brochures highlight the many different roles veterinarians play within FSIS. In order to provide an attractive alternative personnel system for young veterinarians, FSIS signed a Memorandum of Agreement with the Public Health Service Commissioned Corps. Now Commissioned Corps Veterinary Officers can work in FSIS and be eligible for Public Health Service benefits. FSIS has created a Public Health Veterinarian Careers Life Cycle Model to graphically describe the great variety of jobs exist in FSIS (see Table 1). A comparison is provided for Civil Service grade and Commissioned Corps rank. Entry-level positions may be skipped depending on the applicant’s interests and the qualifications required for the position advertised.

FSIS has a cadre of more than 60 program recruiters, including 42 veterinarians, who represent FSIS at 35 colleges and career fair events nationally, including all 28 US veterinary colleges. Senior executives often accompany recruiters at college career days and are available to give lectures on food safety, security, and career opportunities. Each US college of veterinary medicine has been asked to provide an
official point of contact for information specific to FSIS. These contacts are posted on the FSIS Web site.

In both 2002 and 2003, through the Student Career Experience Program, FSIS employed 12 summer veterinary externs at the GS-7 level (base salary starts at $29,500). Student were assigned to veteran mentors who guided them through various experiences in the field. All students were exposed to veterinarians at work in various public health jobs at headquarters in Washington, DC; at the Technical Services Center in Omaha, NE; at the CDC in Atlanta; and at the FSIS laboratory and USDA research complex in Athens, GA. Students completing 16 weeks of employment prior to graduation are allowed noncompetitive placement in a career position of their preference upon graduation. FSIS currently has an extensive veterinary student mentoring network and e-mentors for pre-veterinary students.

In order to reach the career transitional veterinarian, FSIS has conducted mass mailings to state-licensed veterinarians throughout the United States. Approximately 36,000 letters were sent to potential career transition veterinarians for FSIS positions. Advertisements were placed in the *Journal of the American Veterinary Medical Association* and other veterinary publications in order to expand recruitment efforts to practitioners with active state licenses. In 2003, the Virginia-Maryland Regional College of Veterinary Medicine’s Center for Corporate and Government Practice held a successful Career Transition conference to encourage individuals to consider a career shift to the public or corporate sector. Approximately 25 veterinarians paid $300 each to obtain career counseling from a broad range of public and corporate practitioners.

Applying for a federal job can be burdensome and can take up to six months. Recently, FSIS received direct-hire authority for veterinarians as a high-priority agency need. This hiring program reduces the process from months to weeks. Another success is that the Office of Personnel Management is revising the VMO classification standard to increase the entry-level base pay offer from approximately $36,052 to $43,621 and up. With additional recruitment incentives, public practice is becoming more competitive for new graduates.

FSIS also offers recruitment bonuses (up to 25% of the base salary) and payment to move to the first post of duty for specific shortage positions in the field. In fiscal year 2003, $1.2 million was provided in bonuses that could also be used to repay student loans. The agency is moving forward on special salary rates in locations where there has historically been a shortage of veterinarian and is expanding criteria, such as an active state license to practice veterinary medicine, Board certification, and advanced degrees, to offer veterinarians higher entry-level pay if they possess these superior qualifications. The Repayment of Student Loans Directive, published in 2003, allows the agency to use this program to recruit veterinarians and other critical positions as programs allocate funds. The new option to hire Public Health Service Commissioned Corps veterinarians and offer this personnel system as an alternative to the Civil Service provides pay, tax, medical, family-friendly, and retirement benefits that are attractive to recent graduates. FSIS also has implemented a new three-month public health–focused intern training program for all newly hired field veterinarians. Passing this intern training course, which includes on-the-job mentoring, is required as a condition of employment.

**Retention Strategies**

Currently FSIS promotes all veterinarians who have taken a month-long training program and are conducting expanded public health duties as a routine part of their job. The agency also offers higher pay for those veterinarians conducting food safety systems assessment. Such promotions move the pay scale from a minimum of $43,621 to a minimum of $56,707 (plus 30% in federal job benefits), enabling approximately 200 veterinarians to increase their pay by several thousand dollars per year. Another incentive the agency provides is placing veterinarians in the CDC’s Epidemic Intelligence Service for a two-year epidemiology training program.

FSIS has implemented improvements in the veterinary awards program with the goal of recognizing the highest performers in leadership excellence, organizational and team excellence, and field training. New upward-mobility career job options have been created, such as regional trainers and specialists in humane handling enforcement duties, that are very attractive to veterinarians. New proposals are being submitted to provide a process to sponsor employees seeking advanced public health–related degree programs. In addition, in 2003 Congress granted the Secretary of Agriculture the authority to provide FSIS field veterinarians overtime pay at the true time and a half rate. This enables many veterinarians to substantially increase their salaries.

**WHAT THE FUTURE HOLDS: OPPORTUNITIES FOR COLLEGE OF VETERINARY MEDICINE**

Many experts have stated that the veterinary medical profession is a national resource able to provide society with multiple benefits from farm to table. In order to meet the needs of public practice and societal obligation to protect and secure the nation’s food resources, the foundation of training in colleges of veterinary medicine must ensure a “supportive environment for students to explore those aspects of veterinary medicine that are beyond the scope of private practice.”

From the FSIS perspective, an adequate curriculum must include food animal (including poultry) production practices, herd health and population medicine, applied epidemiology, problem solving, and environmental and public health medicine. Because food safety systems control is complex, veterinarians are part of multidisciplinary teams, and the ability to communicate well and to work both independently and in teams are important attributes. A learning environment that supports self-discovery, awareness, and exploration of nontraditional career paths will help provide a cadre of the new public practice explorers needed in FSIS and other federal agencies.

This is a crucial time in our profession to unite and build the partnerships needed to meet the public health and security challenges and opportunities of the twenty-first century. The Association of American Veterinary Medical Colleges has established a Strategic Planning Committee to help colleges of veterinary medicine better prepare students for veterinary public practice. Included in the plan are teams that will present workshops and seminars, develop continuing education and certificate programs, establish regional col-
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<th>Suggested Years at Grade Level</th>
<th>First 5 years</th>
<th>Next 1–5 years</th>
<th>Next 2–5 years</th>
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<td>General Service (GS) Grade</td>
<td>GS 11/12</td>
<td>GS 13</td>
<td>GS 14</td>
<td>GS 15 and SL/SES</td>
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<td>Commissioned Corps Rank</td>
<td>0–3, LT/0–4, LCDR</td>
<td>0–5, CDR</td>
<td>0–6, CAPT</td>
<td>0–6, CAPT/0–7, 0–8, RADM</td>
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**Examples of Career Opportunities**

**Public Health Assurance, Field Operations**
- In-Plant Public Health Veterinarian (PHV)
- Health Officer
- Supervisory PHV
- EIAO (Enforcement and Investigations Analysis Officer)
- Recall Program Officer
- Program Investigation Officer
- Front Line Supervisor
- District Veterinary Medical Specialist
- Recall Program Officer
- Program Investigation Officer
- Deputy District Manager
- Recall Management Deputy Director
- Regional Enforcement Manager
- District Manager
- Director, Recall Mgmt Division
- Asst. Admin, Field Ops
- Deputy Asst. Admin, Field Ops
- Executive Assoc. for Regulatory Operations
- Chief Veterinary Officer
- Program Manager, Field Ops
- Enforcement Manager, Executive

**Public Health Assessment and Policy Development, Technical and Scientific**
- Program Officer (Tech Svc Ctr)
- Scientific, Laboratory Staff Officer
- Policy program officers
- Training program officer
- Human Resources recruiter, program staff
- Scientific staff officers (biologist, chemist, economist)
- Risk analyst
- Food Security officer
- Education, Public Affairs
- Program Officer (Tech Svc Ctr Policy)
- Epidemiologist
- Animal & Egg Production Staff Officer
- Risk Analyst
- Program Analyst
- Scientific staff officer—multiple programs
- Regional Trainer
- Food Security officer
- Education, Public Affairs
- Zoonoses Staff Officer
- Risk Analyst
- Animal & Egg Production National Program Leader
- Policy Staff Leader
- Scientific Research Coordinator
- Training Supervisor
- Human Resources Development Staff
- Biologist, Chemist, Toxicologist, Food Tech
- Senior Executives: All Offices including Policy & Program Development; Management; Public Health & Sciences; Evaluation Enforcement & Review; Food Security & Emergency Prep; Public Affairs and Outreach
- Risk Assessment Advisor (SL)
- Program Director
- Laboratory Scientific Advisor (SL)

**Public Health, International**
- Staff officer
- Staff officer—program auditor, analyst
- International Staff Leader
- Senior Executives including Manager, Codex Alimentarius
- Program Manager
- Senior Advisor, International Food Safety Coordination (SL)
### Table 1 Continued

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<th>Suggested Years at Grade Level</th>
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<td>Professional Development**</td>
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<td>Ongoing Veterinary Medical Professional Continuing Education (CE)</td>
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<td>USDA Accreditation</td>
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<td>Professional Board Certification</td>
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<td>Senior Executive Training</td>
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<td>Professional Details to Other Offices Internal/External to FSIS</td>
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<td>Foreign Animal Diseases</td>
<td>Master of Public Health</td>
<td>Master of Food Science</td>
<td>Other Master Programs</td>
<td>Post-Doctorate Fellowships</td>
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<td>Veterinary Intern Training plus other Center for Learning Professional Courses</td>
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<td>Office of Personnel Management Leadership Courses (OPM)</td>
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<td>FSIS Competency Evaluations &amp; Individual Development Plans</td>
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* This model provides a snapshot of the myriad opportunities for veterinarians in FSIS. Depending on your qualifications and the position advertised, you may skip entry-level grades.

** Professional development is a shared responsibility of the employee and the employer. The Veterinarian's Oath states "I accept as a lifelong obligation the continual improvement of my professional knowledge and competence." This chart provides information on approximately when in the Model certain professional development would be beneficial to enhancing your public practice skills in protecting public health and food security.
lege consortia, and develop new biomedical research career opportunities. Funding public practice programs is, and will continue to be, a challenge for both public and academic institutions.

Other initiatives that colleges of veterinary medicine could further explore include opportunities to support externships at every college. The FSIS is interested in partnering with colleges and leveraging resources; additionally, the agency could help develop a program that would leverage funds from various sources to establish a veterinary student scholarship fund leading to post-graduation employment in FSIS. We could create a national register of expert speakers in food safety and security and distribute lists of veterinary mentors and their locations. The agency could also work with interested parties to establish a FSIS public health residency program and post-doctoral fellowships in public health assurance and food security. FSIS could establish partnerships with food animal or public health–oriented faculty to share training materials on the FSIS Virtual University. Career transition conferences could be self-supporting, with dynamic public health practitioners invited to share career pathways. Memoranda of Agreement between colleges of veterinary medicine and the FSIS could be developed to provide externship opportunities for veterinary students. Although this list is extensive, the author is interested in receiving feedback on what options could assist colleges and universities in promoting public practice career options.

CONCLUSION
Public and academic institutions must move forward together to address societal needs in nontraditional public practice careers. This is a critical time in history when public health and food security programs are in dire need of veterinary medicine’s expertise. Now is the time for veterinary medical educators to strengthen the critical infrastructure needed by continual exploration of the profession’s diversity of opportunities. Veterinary medicine has limitless potential to serve the nation and the world as leaders in public practice.

NOTE
Refer to the US Public Health Service Web site <www.usphs.gov>.

REFERENCES

AUTHOR INFORMATION
Bonnie J. Buntain, DVM, MS, Dipl. ACVPM, is the Chief Public Health Veterinarian of the USDA-Food Safety and Inspection Service, Office of Field Operations, 1400 Independence Ave. SW, Rm. 3159-S, Washington, DC 20250–3700 USA. E-mail: bonnie.buntain@fsis.usda.gov. Veterinary education interests include applying public health principles to food safety and security. Dr. Buntain is committed to working with faculty to excite veterinary students and pre-veterinary students about public practice careers. As Chief Veterinarian she is responsible for the recruitment and retention of veterinarians committed to public service.