

Agricultural and Natural Resources Update – December 2014

NEW CAHFS BUILDING WILL BOOST ANIMAL HEALTH AND PUBLIC SAFETY

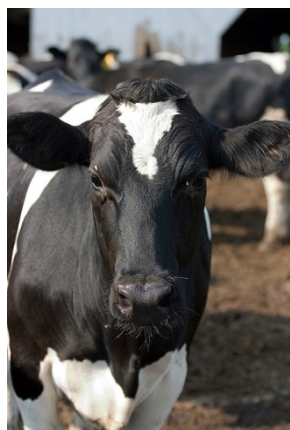
Beef or dairy cattle affected with acute respiratory distress and death, suspected bovine tuberculosis from a slaughter plant, a disease outbreak on a poultry farm—all of these types of cases come to the Tulare branch of the California Animal Health and Food Safety Laboratory System (CAHFS). The laboratory, part of California's early warning system, safeguards public health from foodborne pathogens, toxins, and diseases common to animals and humans. Soon, the facility will be able to handle more cases with the completion of a new building, slated to be completed in December 2015.



For nearly 30 years, CAHFS has been co-located in Tulare with the Veterinary Medical Teaching and Research Center. The new facility will provide state-of-the-art diagnostic laboratory and support amenities. Designed with an open-laboratory concept, the one-story, 45,000 sq. foot building will accommodate current biosafety and biosecurity needs, and provide the flexibility to adopt ever-changing diagnostic technologies.

John Adaska, branch chief of the Tulare laboratory, reports that the team will be able to offer PCR testing (currently sent to the Davis lab), additional serologic testing and other tests not currently available at the Tulare location. The new facility will allow the team to improve turnaround times on critical tests and increasing efficiency in delivering services to clientele.

MYSTERY OF BLUETONGUE LIVESTOCK DISEASE SOLVED



The bluetongue virus, which causes a serious disease that costs the cattle and sheep industries in the United States an estimated \$125 million annually, manages to survive the winter by reproducing in the insect that transmits it. These findings, by Christie Mayo, James MacLachlan and a team of veterinary scientists, solves a century-old mystery and are particularly significant as global climate change brings more moderate winter temperatures around the world. The new study appeared Sept. 12 in the journal PLOS ONE.

The epidemiological study was conducted on a commercial dairy farm in Northern California. Scientists were able to demonstrate that the virus overwinters in female midges that had fed on an infected animal during the previous season. This discovery has important ramifications for predicting the occurrence of bluetongue in livestock and hopefully for eventually developing controls for the disease.

Bluetongue disease, first identified during the 1800s in southern Africa, is transmitted by the *Culicoides* biting midge, a tiny gnat sometimes referred to as a “no-seeum.” The disease mostly sickens sheep but also infects

cattle and goats, as well as deer and other wild ruminants. In the U.S., the virus' greatest economic impact is in the cattle industry, because it is bigger than the domestic sheep industry and most adversely impacted by international trade barriers related to bluetongue. The virus that causes bluetongue was first isolated and identified in the Western Hemisphere in the early 1950s at the UC Davis School of Veterinary Medicine. The disease does not pose a threat to human health.

SAFEGUARDING CALIFORNIA'S MILK SUPPLY

The safety of California's dairy products — the state's top agricultural commodity, valued at nearly \$7 billion in annual retail sales — results in part from the efforts of the San Bernardino branch of the California Animal Health and Food Safety Laboratory system. This network of laboratories, headquartered at UC Davis and administered by the UC Davis School of Veterinary Medicine on behalf of the California Department of Food and Agriculture, performs surveillance and diagnostic testing for livestock and poultry.

The San Bernardino laboratory carries out work on milk and dairy products that are submitted by the state's Milk and Dairy Foods Safety Branch. The laboratory's bacteriology section tests for a variety of disease-causing microbes including: *Listeria*, *Brucella*, *Salmonella*, *Campylobacter* and *E. coli* O157:H7. Approximately 1,500 samples of milk, dairy products and water arrive monthly at the San Bernardino laboratory resulting in approximately 4,200 tests conducted by a team of eight technicians. These microbiological assessments monitor bacteria populations and the effectiveness of pasteurization in destroying harmful bacteria in order to safeguard California's milk supply. <http://www.ucdavis.edu/ucdavis-today/2014/september/04-ice-cream.html?cp=1>

SALMONELLA RESEARCH ON MULTIPLE FRONTS

Salmonella Heidelberg has been a problem for the poultry industry in California and has been associated with human outbreaks since last year. Collaborative research efforts on multiple fronts are in progress at the School. Efforts are focused on:

- Increasing the overall understanding of Salmonella Heidelberg;
- Sequencing of field strains of Salmonella Heidelberg which have been exposed to different disinfectants commonly used in processing plants to better understand the virulence of the bacterial infection;
- Development of identifying predictors of the presence, or absence, of Salmonella in live production and processed broiler chickens;
- Comparison of the efficacy of various Salmonella control measures.



INFECTIOUS BURSAL DISEASE VIRUS

Very Virulent Infectious Bursal Disease Virus (vvIBDV) is a problem restricted to the California poultry industry. Infection from backyard flocks can be especially serious for industry producers. In collaboration with colleagues at the California Animal Health and Food Safety Laboratory System (CAHFS) and Vet Med Cooperative Extension, faculty are working on non-invasive diagnostic tests in the hope of being able to detect the disease early by a simple diagnostic procedure. If proven, this straight forward method would allow rapid containment measures to be implemented in the event of a positive result, either in backyard flocks or in the commercial poultry plant/industry.

NEW FACULTY

Dr. Meera Heller joined the Department of Medicine and Epidemiology as an Assistant Professor of Clinical Livestock Medicine and Surgery in August. Dr. Heller received her DVM (2001) and PhD in Comparative Pathology (2009) from UC Davis. She completed a Large Animal Medicine and Surgery Internship at the Atlantic Veterinary College (2002) and a residency in Large Animal Internal Medicine at UCD (2005). Dr. Heller is a Diplomate of the American College of Veterinary Internal Medicine – Large Animal (2005). Dr. Heller joins us from the University of Missouri where she was an Assistant Professor of Food Animal Medicine and Surgery. Dr. Heller's research interests are in the areas of innate immunity and juvenile immunity, especially as they pertain to prevention and treatment of calfhood disease. Her clinical expertise is in internal medicine and surgery of ruminants and swine, with a special interest in goats.



Dr. Simone Stoute joined the California Animal Health and Food Safety Laboratory System (CAHFS)-Turlock Laboratory and the Department of Population Health and Reproduction, as an Assistant Professor of Clinical Diagnostic Veterinary Medicine, effective October 1, 2014. Dr. Stoute obtained her DVM (2004) from the University of the West Indies, Trinidad. She completed a 2-year Avian Disease Specialist residency in the CAHFS Turlock laboratory and also received Diplomate status by the American College of Poultry Veterinarians. Dr. Stoute then went on to complete her PhD (2012) in molecular virology from The Ohio State University. She joins us from the Cornell University where she served as Director of the Cornell Duck Research Laboratory. Dr. Stoute's current research interests focus on documentation of new and/or unusual diseases. She was responsible for the first diagnosis of very virulent Infectious Bursal Disease Virus in the United States and has gone on to do additional investigative work with this virus.

CURRENT FACULTY RECRUITMENTS

Professor of Aquatic Animal Medicine
Professor of Microbial Pathogenesis
Professor of Infectious Diseases
Professor of Clinical Livestock Herd Health
Professor of Clinical Livestock Reproduction
Specialist in Cooperative Extension for Urban Agriculture Food Safety

EXCERPTS FROM FRESNO BEE OP ED BY TERRY LEHENBAUER: DAIRY HERD HEALTH IS PARAMOUNT

More than 30 years ago, the Tulare was selected as the site for the Veterinary Medicine Teaching and Research Center, in the middle of what would become the heart of California's dairy industry. The faculty conduct research on a variety of topics aimed at improving dairy cow health and milk production and addressing diseases of economic impact to producers. The team is also focused on training the next generation of dairy cattle veterinarians. Because of our unique programs emphasizing dairy cattle, we provide clinical instruction to veterinary students from UC Davis and to students from veterinary schools across the U.S. and around the world. The Valley location provides access to more than 900,000 dairy cows among 560 dairy herds in Tulare County and the surrounding counties.



Our instructional programs train these future veterinarians in nutrition, reproduction, udder health and milk quality, disease control and treatment, and calf-raising. When treatment is necessary, we train students to implement and monitor drug-therapy plans that will provide cures. And we teach students how to prevent drug residues in milk and meat by following required drug-withdrawal guidelines in cattle they treat. Veterinary students gain knowledge and skills by working with dairy cattle and calves at our clients' dairy farms. These students gain additional experience by analyzing computerized dairy cattle health and production records and by culturing milk samples in our milk quality laboratory to detect bacteria and other organisms that can cause mastitis, an inflammation of the cow's udder or mammary gland. Our students also work with CAHFS diagnostic pathologists to better understand the cause of disease, how it can be diagnosed, and most importantly, how it can be prevented.

The full Op Ed piece can be accessed at: www.vetmed.ucdavis.edu/whatsnew/article.cfm?id=3006

“ONE CALIFORNIA” AG CAMPAIGN

The school has partnered with the university in a multi-media campaign, “One California,” to promote UC Davis’s leadership in agriculture and food safety through its College of Agricultural and Environmental Sciences, School of Veterinary Medicine, World Food Center and other programs. Together, we’re telling the stories of how veterinarians, food and animal scientists, students and alumni, farmers, ranchers, processors, and others work to keep California’s \$45-billion-a-year agricultural industry growing. The campaign will include print/TV/radio features, social media, billboards, events, fact sheets and a web site. For more information: <http://www.ucdavis.edu/one/california/>

NEW COMMUNICATIONS OFFICER – ANIMAL AGRICULTURE

The School welcomed Monique Garcia Gunther as our first dedicated Animal Agriculture Communications Officer. This position expands the communications team’s focus and ability to promote the extensive work, outreach activities, and educational commitment associated with our faculty and professionals in the area of livestock, poultry, small ruminants, aquaculture, food safety and security, and related one health initiatives. Ms. Garcia Gunther earned her BA in Journalism, Public Relations and English in 1993. She has previously served as the Communications Director for the Sacramento Area Commerce and Trade Organization and held PR positions with Deen and Black Public Relations, and Ogilvy Public Relations Worldwide. She has a strong background and track record in client and program communications, issues management, PR strategy, message development, media relations, brand identity, strategic partnership development and in the generation of a wide range of communication and marketing materials.



SCHOOL OF VETERINARY MEDICINE DISTINGUISHED SERVICE AWARD



Dr. John Maas is recognized for his outstanding efforts to advance livestock animal health, deliver educational programs on food safety, cattle diseases, nutritional requirements and environmental impacts, and leadership in state and national cattle organizations. Dr. Maas served the veterinary profession for 40+ years with a dedicated focus on livestock animal health, first as a private practitioner, then as a diagnostician with the UCD California Veterinary Diagnostic Laboratory (now CAHFS). In 1993 he joined UC Cooperative Extension and began developing beef cattle outreach programs. An active cattle rancher throughout his life, Dr. Maas is widely recognized by the cattle industry for his leadership within the

industry and his liaison efforts with the scientific and veterinary communities. He provided guidance to develop and implement the National Beef Quality Assurance program that encompasses the contemporary issues of food safety, land stewardship, environmental impacts of cattle operations, along with animal health, welfare and handling. Dr. Maas was also instrumental in educating the entire chain from “farm to fork” which includes beef and dairy producers and management of feed yards, cow/calf operations, auction facilities, hauling and transportation companies, and slaughter facilities.

FARM-TO-FORK FESTIVAL

More than 30,000 people attended the second annual Farm-to-Fork Festival held on Capitol Mall in downtown Sacramento. California’s state capitol building was the backdrop for the food vendors, entertainment stages, and educational booths that stretched the length of the Mall. The School’s booth provided festival goers a lesson in food safety. Faculty and researchers from the Western Institute for Food Safety and Security (WIFSS) were on board to talk about food safety and harmful pathogens that cause foodborne illness.



Several hundred adults and children enjoyed the bean bag toss where they aimed for one of four buckets symbolizing the FDA’s four simple steps to food safety: clean, separate, cook and chill. In addition to accurately hitting the target, they answered a question which centered on one of the four food safety areas.

One visitor wondered what veterinary medicine has to do with food safety. Heather Johnson, training and certification specialist at WIFSS, explained that, “Veterinarians have an important role to play in food safety as they are very important to the health of food animals, such as cattle, pigs, chicken, and the like. Vets can also help with produce food safety because they know about the pathogens, or “bad bugs,” that animals may shed in the environment.”

Animals, including livestock and wildlife, can be reservoirs for disease agents that can lead to human illness, including E. coli O157:H7, found in the gut of many mammals. Programs at the school such as the [Western Institute for Food Safety and Security](#), the [Veterinary Medicine Teaching and Research Center](#) and the [California Animal Health and Food Safety Laboratory System](#), do much to protect the food supply and support agricultural producers and commodity groups.

INTERNATIONAL IMPACTS - DAIRY TRAINING AIMS TO BOOST RWANDA TO HEALTH

In Rwanda, the expression “have milk” — “gira amata” is a wish for prosperity. UC Davis scientists hope to make that wish come true in the small African nation, by improving dairy cows’ health and productivity -- and thereby people’s health, too.

Dairying is a centuries-old enterprise in Rwanda, but production levels are quite low, and the milk is often contaminated with bacteria that pose health risks for cows and people. Rwandan cows produce just 5 liters of milk per day on average, whereas if the cows were healthy and well cared for, they should produce 25 to 40 liters per day.



The UC Davis Global HealthShare Initiative is coordinating a partnership among campus scientists and students, and their colleagues in Rwanda how to improve the health and productivity of dairy cows and the safety of milk and how to provide the same training around Rwanda, a nation of smallholder farmers. The UC Davis team, which includes Jim Cullor, veterinary professor and director of the school's Dairy Food Safety Laboratory, is focusing on mastitis, a bacterial infection of the cow's udder and the most common dairy cattle disease in the United States. In Rwanda, mastitis reduces milk production, causes milk to be unfit for sale and may result in the cow's death.

During the past year, the UC Davis team has provided training to 40 Rwandan veterinary students, university faculty and government officials, teaching them practical techniques for preventing mastitis and identifying the different types of bacteria that are likely to be found in milk.

The Global HealthShare team is also passing on Dairy Dynamic Management techniques developed through the Dairy Food Safety Laboratory and implemented through the Global HealthShare Rural Tech program. This on-farm training is designed to improve animal health and well-being, ecosystem health, food safety and the economic well-being of Rwandan smallholder farmers. The UC Davis team is training the Rwandan veterinary students so that they can go from village to village, training farmers how to raise healthier, more productive cows.

Underproduction of safe milk presents a serious human health dilemma as well as an economic challenge for Rwanda. Nearly 60 percent of Rwandans live below the poverty line — 40 percent subsisting on less than 90 cents per day, according to U.S. Aid for International Development. And 44 percent of Rwandan children under the age of 5 suffer from stunting. Nutritionists use the term 'the first 1,000 days' — that window of time when nutritional interventions can prevent permanent damage to the body. If children are raised on contaminated milk during that time, their cognitive development can be permanently damaged as adults. The UC Davis team hopes that, in some small but important way, the dairy program can help improve the nutrition and developmental health of Rwandan children.

INTERNATIONAL FOOD SAFETY

Faculty and top level administration from Northwest Agriculture and Forestry University in Yangling, Shaanxi Province, China, UC Davis, the Chinese Ministry of Science and Technology, and USDA met at Yinchuan, China where they discussed a series of priority topics, one of which was mechanisms to promote safe food across the food continuum for China.



Rob Atwill, Director of the Western Institute for Food Safety and Security, reviewed the many international opportunities for collaboration in food safety between University of California, Davis and Northwest Agriculture and Forestry University. In particular, many opportunities exist for developing pre-harvest intervention programs that can reduce the risk of microbial contamination at the source of production, thereby improving food safety during processing and distribution. Harris Lewin, Vice Chancellor of Research, UC Davis, and Wu Pute, Professor and Vice President of Northwest Agriculture and Forestry signed the MOU to initiate the Sino-U.S. Joint Research Center for Food Safety

Also present at the signing were Catherine Woteki, Under Secretary for Research, Education and Economics at the USDA; and Vice Minister Zhang Laiwu of China's Ministry of Science and Technology. This new center will foster joint research, technical guidance and develop governmental policy on global food safety in China, greater Southeast Asia and Africa, while also focusing on developing adoptable solutions to key main hazards across the food continuum.

WIFSS currently has five different programs underway in China addressing food and waterborne disease issues. Its working agreement with Nanjing Agricultural University is a good example of how WIFSS's leadership is promoting food safety internationally and building strong partnerships worldwide. The comprehensive programs of the One Health Center in Nanjing will help build the workforce for China's expanding food safety.

CALIFORNIA ANIMAL HEALTH AND FOOD SAFETY LABORATORY – [CAHFS CONNECTION](#)

Highlights from the November-December CAHFS e-newsletters:

Bovine

- **Valvular endocarditis** was identified as the cause of acute death in a 3-year-old Angus cow.
- **Mycoplasma bovis** caused **mastitis, cellulitis and arthritis** in a first calf dairy heifer submitted from a dairy which had 8-10 similarly affected animals.
- **Nitrate toxicosis** resulted in the death of four Angus cows in a herd of 50 that were found dead the morning after making a feed change.
- **Blackleg** due to **Clostridium septicum** caused the sudden death of six, yearling Holstein dairy heifers in a pen of 80 heifers.

Small Ruminant

- **Campylobacter jejuni** was the cause of third trimester abortions in two sheep flocks.
- **Copper deficiency** was the cause of hind limb ataxia progressing to recumbency over a six week period in a 5-month-old dairy goat kid.
- **Boomer disease virus** was detected in a premature stillborn lamb.
- **Selenium deficiency** was the cause of lateral recumbency and anorexia in a 3-year-old ewe submitted.
- **Mycoplasma mycoides spp mycoides LC infection** was diagnosed in a kid and an adult female Nubian goat.

Poultry and other Avian

- **Coccidiosis due to Eimeria burnetti** was the cause of increased mortality in a flock of over 40,000, 31-day-old layer pullets.
- **Squamous cell carcinoma** of the pharynx and adjacent tissues was the cause of death in a 5-year-old male buff Orpington backyard chicken.
- **Histomoniasis (Blackhead)** was diagnosed in two turkeys that had severe multifocal necrotic hepatitis and focal ulcerative typhlitis.
- **Pentobarbital poisoning** was diagnosed in two adult turkey vultures found in close proximity in Marin County.
- **Avian poxvirus** caused severe **otitis externa** and media in a backyard flock hen with possible secondary bacterial infection.
- **Avian Encephalomyelitis virus infection** was diagnosed as the cause of trembling, ataxia, circling, lateral recumbency, head tremors, wing walking, unsteady gait and/or inability to stand in multiple flocks in the past two months.

Pig

- **Porcine reproductive and respiratory virus (PRRS)** was the sole agent detected in a 4-month-old pig that died 48 hours after the onset of a cough.
- **Streptococcus suis** was the cause of severe meningitis in a 4-month-old pig.

TIPS FOR CATTLE SAFETY AND HEALTH DURING DROUGHT

Throughout the year veterinary toxicologists Robert H. Poppenga and Birgit Puschner, with the California Animal Health and Food Safety Laboratory System (CAHFS), have worked with dairy and beef producers to provide critical information to keep their livestock healthy during the drought. Drought can increase the risks of animal poisonings and nutritional imbalances, and necessitate additional vigilance to assure cattle health and productivity. Key threats to cattle include:

Water quality—Water is the most critical factor in the diet of food animals. When cattle don't drink enough clean and safe water every day, feed intake and productivity declines. Drought conditions can potentially affect all sources of water, including groundwater, but surface waters are especially vulnerable. It is especially important to frequently monitor water quality, especially as quantity becomes more limited, and test for basic water quality parameters such as total dissolved solids, sodium, sulfates, and nitrates/nitrites.

Feed Quality and Nutritional Deficiencies—Drought conditions frequently result in the need to feed poor quality forages or to switch to alternative feed sources. Both can affect animal nutrition and increase the risk for intoxications. Use of poor quality forages can cause or exacerbate deficiencies of important minerals such as selenium, copper, and phosphorus and vitamins such as vitamins A and E.

Increased Incidence of Plant Poisonings—Cattle will seek out and consume plants that they would not otherwise find palatable during drought conditions. Nitrate poisoning is one of the most common plant associated intoxications diagnosed at CAHFS. The potential for nitrate poisoning to occur is increased when livestock water sources also contain elevated concentrations. The first sign of nitrate poisoning is often the sudden and unexplained deaths of one or more animals.

Additional information and testing is available at the California Animal Health and Food Safety Laboratory System at: www.cahfs.ucdavis.edu. A longer, more detailed version of these tips may be found here.

VETERINARY SCIENTISTS ON THE EBOLA FRONTLINE

Beginning in September two veterinary scientists working for the Centers for Disease Control and Prevention (CDC) who received their Ph.D. and DVM degrees from the UC Davis School of Veterinary Medicine traveled to West Africa to work on the front lines of the Ebola outbreak. Professor James MacLachlan, their mentor at UC Davis, says “veterinary researchers like Dodd and Bird with the joint skillset of a DVM and PhD are invaluable in dealing with One Health situations like this Ebola outbreak where emerging and zoonotic diseases have such a devastating impact on global health – a great example for what a veterinary degree can lead to.”

Kim Dodd, a current UC Davis combined degree student (Ph.D. '14, DVM '15), joined her mentor and UC Davis alum Brian Bird in Sierra Leone in early September. Dr. Bird (Ph.D. '08, DVM '09) serves as a veterinary medical officer in the Viral Special Pathogens Branch of the CDC and is now the Lead of the CDC Ebola Field-Laboratory



located at an Ebola Treatment Unit in Kenema, Sierra Leone. This field-laboratory supports the international response to this unprecedented outbreak in partnership with the Sierra Leone Ministry of Health, the World Health Organization (WHO) and other international collaborators. The laboratory serves as a regional reference laboratory to provide rapid Ebola testing. Dodd and Bird provide critical testing to identify cases so that rapid tracing of patient-contacts can begin and to reduce the transmission of Ebola within the population. Early and rapid testing is important as the initial clinical signs of Ebola virus infection can be nonspecific and similar to those seen with malaria, lassa fever, or other tropical diseases. Rapid identification of positive cases is essential for referral to Ebola treatment centers, and to send negative cases elsewhere for treatment and follow-up, thus reducing community transmission and control the outbreak.

PARTNERSHIP WITH UNIVERSITY COLLEGE DUBLIN

The University of California, Davis and the University College Dublin have signed an agreement of cooperation to further develop education, research, innovation and cultural links between the two institutions. Dean Michael Lairmore was specifically invited by University College Dublin's School of Veterinary Medicine to participate in the signing ceremony on September 24th at the Irish Embassy in Washington, DC. This agreement builds on the established links between, and internationally reputation of, both institutions--particularly in the areas of agriculture, food and health, and veterinary medicine.

http://news.ucdavis.edu/search/news_detail.lasso?id=11037