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Animal Health MATTERS Newsletter

Veterinary and Biomedical Sciences

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Animal Health MATTERS

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Animal Health MATTERS

December 2013



SDSU's ADRDL Receives Full Accreditation through AAVLD

Russ Daly, Rajesh Parmar, SDSU

The South Dakota Animal Disease Research and Diagnostic Laboratory (ADRDL) was recently awarded full accreditation by the American Association of Veterinary Laboratory Diagnosticians (AAVLD). This is the highest level of accreditation awarded by the organization, granting the ADRDL full accreditation status for all animal species through December, 2018.

The accreditation process was administered by the AAVLD Accreditation Committee with significant input from a site visit team comprised of laboratory officials throughout the US. The site team evaluating SDSU consisted of Mr. David Korcal, Michigan State University, Dr. Tim Baszler, Washington State University, and Ms. Laura Bouwens, California Animal Health and Food Safety Laboratory. The team visited the laboratory and performed an on-site audit September 23-25, 2013. Prior to the visit, the ADRDL submitted documentation to the Committee that outlined laboratory administration, funding, functions, and procedures, along with the lab's Quality Manual and system-wide Standard Operating Procedures (SOP's).

The actual audit examined all the processes that take place between the receipt of samples at the laboratory to reporting final results to the submitter. The three AAVLD auditors inspected the lab and verified that the diagnostic work performed met AAVLD standards. During the audit, auditors interviewed ADRDL employees and inspected diagnostic procedures, training records, equipment maintenance and calibration records, quality control records, test method validation data, and many more items related to diagnostic work. They also had an opportunity to visit with the ADRDL Advisory Board and Barry Dunn, Dean of the



Members of the AAVLD Accreditation Audit Team address ADRDL faculty and staff following their three-day visit to SDSU. The ADRDL was awarded the highest level of reaccreditation, a term of five years. (L-R) David Korcal, Michigan State University; Laura Bouwens, California Animal Health and Food Safety Lab; and Tim Baszler, Washington State University.

College of Agriculture and Biological Sciences, and Provost Laurie Nichols while on campus.

The auditors and Accreditation Committee found that the ADRDL has in place a robust Quality Management System based on their requirements, which are derived from the World Organization for Animal Health (Office International des Epizooties – OIE) guide and are very similar to ISO – 17025 standards applicable for laboratory testing.

The accreditation report also identified opportunities for improvement, which are now being acted upon in the spirit of continuous improvement of the quality of diagnostic services at the ADRDL. In addition, the report also observed that “Biosafety Level 2 [BSL-2, the usual biosafety level for animal diagnostic work] space is at a premium. Given the growth of the molecular section, it

is critical for the ADRDL to obtain additional BSL-2 laboratory space that will provide adequate separation of space particularly in the molecular section. In addition, consideration should be given to the addition of BSL-3 necropsy and laboratory space...”

In a letter to ADRDL leadership, Dr. Beverly Byrum, chair of the AAVLD Accreditation Committee, stated, “I would like to extend congratulations to you and the staff of the Animal Disease Research and Diagnostic Laboratory on achieving Full Accreditation. The site visit team enjoyed the opportunity to review your laboratory and appreciated the hospitality. We look forward to your continued participation in AAVLD activities.” Dean Barry Dunn also offered congratulations upon the news of re-accreditation:

Accreditation (Continued on page 2)

Director's Message: Being a "Game Changer"

Jane Hennings, DVM, MS — Director ADRDL

Inspiration is important in going forward into the New Year and I can honestly say that I was greatly inspired this morning when I watched a TV show called "Game Changers". Typically, I don't watch TV on a Saturday morning, but I really needed to go running and since the snow was a bit too heavy to run in, I had to run on my treadmill while I watched TV. In devising directions for the New Year, it will be important to evaluate what we are doing by measuring "impacts" (eg. "game changing" events). For example, we can measure numbers of articles, abstracts, grants, tests performed, etc., but did they have an "IMPACT" (eg. were they a "game changer")? The show told of professional sports players making a differ-



ence in Cincinnati by having programs designed to inspire students with the motto, "learning is cool"; encouraging and giving an opportunity to a handicapped student to make the winning basketball play at the end of the game and telling the story of a baseball coach that started a house for kids that were abused. All of these activities had impacts that "changed" the status quo. When I think of veterinary medicine and research, I hope we can be a "game changer" for you. This will take much work in providing important diagnostics, vaccines and education in science for the next generation. Since veterinarians are on the "front lines" of infectious disease and medicine, we will want to stand with you to provide what you need. Please let us know how we can help you the best.

Currently, we are starting to have impact on a serious disease syndrome first seen in the US this May. I would like to thank those in our laboratory that have "stepped up to the plate" and provided many needed resources to control

the new infectious disease of "porcine epidemic diarrhea virus" (PEDV). We have developed monoclonal antibodies for diagnostics (not currently available in the US until now), assisted in putting out a new commercially available real-time PCR assay, developed new antibody tests, immunohistochemistry and virus isolations that are needed for diagnostics and vaccine development. Hopefully, we can start changing the game for the wins that are needed against this infectious disease and continuing to make progress in numerous other areas important to the livestock industry.

To give us your input on how we can help you and be a game changer in the New Year, please contact me directly at: Jane.Hennings@sdstate.edu or use our "Customer feedback and comments" link on our webpage to do this. <http://www.sdstate.edu/vs/customer-quality/index.cfm> ■

Accreditation

(Continued from page 1)

"Given that the process took place in a time of leadership transition is especially heartening. There is an exceptional team of people in the lab. And the facts spoke for themselves; we have an excellent ADRDL that provides great service to our

stakeholders and does it in ways that meets or exceeds professional standards!"

Significant effort prior to and during the audit visit fell onto the shoulders of Rajesh Parmar, Quality Systems Manager, as well as new department head Dr. Jane Hennings, who had been in her position exactly a month at the time of the audit. A very solid base for this and future accreditation efforts was put into place by past director Dr. David Zeman, past associate director Dr. Tanya Graham, and interim department head Dr. Russ Daly. However, the achievement was the result of ongoing hard work on the part of virtually every employee of the ADRDL. ■



Bailey Herd Health Conference to focus on Food Animal Vaccination Considerations

Watch your mail for information about this year's James Bailey Herd Health Conference, to be held Saturday, February 8, 2014, at SDSU in Brookings. The current state of vaccination programs and the latest research on vaccine considerations will be presented by Dr. D. L. Step from Oklahoma State, along with SDSU's own Chris Chase and other speakers. The program will look into beef and dairy, as well as swine and small ruminant vaccination considerations.

Planned for this year is a Friday afternoon CE program that will give practitioners and industry reps an update on what is new at the ADRDL. Watch your mail for registration info or call Janice at 605-688-6649 for more information.

SDSU Creates Extension Position for Livestock Stewardship

By Heidi Carroll, MS, SDSU Livestock Stewardship Extension Associate

(Editor's note: In late July, Heidi Carroll started in a new position for SDSU Extension, that of an Extension Associate for Livestock Stewardship. This new position reflects the increasing interest that producers, veterinarians, and the food-consuming public have towards the way animals are raised and cared for.

Heidi is a native of Bellingham, MN (just east of Milbank). She holds an MS in Animal Science from SDSU with an emphasis in Ruminant Nutrition. Her Masters' work, completed in March 2013 under Dr. Robbi Pritchard, included a component on cattle behavior. In 2009, she spent 9 months teaching English at China Agricultural University in Beijing, China. While at SDSU, she had extensive experience working with animals in the DeHaan Equestrian Center as well as several of the SDSU livestock units. In her spare time she enjoys helping her husband's family with their cow/calf operation, riding horses and enjoying the outdoors. Heidi is a great addition to our Extension staff and looks forward to working with animal producers, veterinarians, and the public on animal care and quality assurance programs. Welcome, Heidi!!

Over time, the image of raising livestock has changed as new production technologies and management systems have been introduced. However, the foundation of livestock husbandry remains the same. Livestock producers seek to provide for the needs of the animal and in return, animals provide healthy food products for our growing population.

Raising livestock is a complex endeavor. Producers must implement disease prevention programs, handle and transport animals in a low stress manner, adapt management plans in responses to weather extremes, adjust feed rations to match the animal's need, and monitor body condition scores. These and many other things are necessary to promote overall livestock well-being. Livestock stewardship is a daily responsibility. A responsibility that requires animal caretakers to evaluate their actions and decisions to ensure they are appropriate at all times. We should consider the animal's response when we are performing routine tasks to provide indicators of possible well-being concerns that may indicate

opportunities for improvement of the operation. The key to successful livestock stewardship is setting high expectations of each other as fellow livestock producers. We need to take ownership of our responsibility to follow through with what we say we are going to do to provide quality food products.

Promoting Our Responsibility

In July, I started my new position as SDSU's Livestock Stewardship Extension Associate. This exciting opportunity will expand on current livestock extension programs to incorporate additional information and resources for producers concerning animal well-being issues. I will work closely with livestock specialists and other experts to provide educational material on evaluating livestock well-being. Additionally, I desire to build relationships within the livestock industry and among veterinarians to ensure critical production challenges and potential consumer concerns are being addressed.

My main goal for the livestock stewardship program is to partner with livestock organizations on their quality assurance programs and promote South Dakota producer participation in these programs. Quality assurance programs

are a great foundation for responsible livestock production and show consumers our commitment to animal care.

Another area I will focus on is youth. I hope

to partner with the 4-H Livestock personnel to incorporate the basics of animal well-being into all animal projects. A Pork Quality Assurance program is already being offered through the support of the Pork Check Off. In the future, I think it is imperative to provide these same programs for the other species within 4-H programs.

South Dakota producers play an integral role in the United State's food supply. As such, we should demonstrate our commitment to livestock stewardship for our consumers through our daily actions, voluntary participation in quality assurance programs, and education of future livestock producers. ■



SDSU Porcine Epidemic Diarrhea Virus Research Presentations at 2013 Conference of Research Workers in Animal Diseases

Development of an Indirect ELISA for Detection of Antibodies Against Porcine Epidemic Diarrhea Virus (PEDV)

Steve Lawson, Faten Okda, Xiaodong Liu, Travis Clement, Aaron Singrey, Jane Christopher-Hennings and Eric Nelson

Development of monoclonal antibodies and other reagents for detection of porcine epidemic diarrhea virus (PEDV)

Aaron Singrey, Steve Lawson, Faten Okda, Travis Clement, Craig Welbon, Jane Christopher-Hennings and Eric Nelson

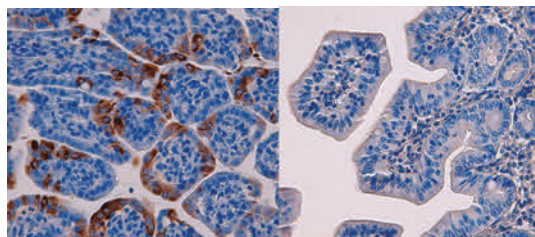


Figure 1. Immunohistochemistry staining of piglet intestinal tissue with PEDV anti-nucleoprotein monoclonal antibody SD-17-16. The left panel shows tissue staining of an acutely infected piglet, while the right panel represents negative control tissue (400X). (photo from SDSU ADRDL)

ADRDL Bacteriology Section Working at the Cutting Edge

Russ Daly, Seema Das, SDSU

Bacterial diseases of animals such as tuberculosis, brucellosis, and anthrax were major reasons why veterinary diagnostic laboratories were established many years ago. The ability to culture and identify bacteria causing livestock disease was among the tools that made it possible to initiate eradication and control programs for many economically important diseases.

Those diseases remain important to this day for livestock producers in South Dakota, but the methods used in their detection have improved and evolved greatly. Many traditional tests for bacterial identification are being replaced by technologic advances such as MALDI-TOF/MS (see accompanying story). But despite these new methods, basic knowledge of bacterial culture and enrichment techniques still remain critical to effective diagnostics.

In addition, bacterial diseases continue to plague animal populations and are continually evolving. Bovine respiratory disease complex, pinkeye, mastitis, Johne's disease and mycoplasmosis are bacterial diseases that continue to cause illness and losses in animals. In South Dakota, the bacterial disease anthrax is an almost annual event, resulting in cattle losses. Emerging issues such as antimicrobial resistance, clostridial diseases of calves, *E. coli* O157:H7 and tularemia illustrate that bacteriologic techniques employed at SDSU's ADRDL will remain critical tools in veterinary diagnostics and research.

Needed along with the tools, though, are the people with the knowledge and expertise to use them. The bacteriology section at the South Dakota State University Animal Disease Research and Diagnostic Laboratory is comprised of a staff of nine individuals, each with their own areas of expertise. Among them, they performed over 11,000 aerobic and anaerobic cultures in FY 2012, along with 1,100 antimicrobial susceptibility panels, in addition to a battery of other bacterial cultures and diagnostic tests.

In recent years, the section has seen an increase in requests for aquaculture diagnostics and has brought on new procedures to help service that diagnostic need.

The SDSU ADRDL bacteriology section is made up of these individuals:

Section Leader: Larry Holler DVM, PhD has served as Section Leader for the bacteriology section for the past eight years.



SDSU ADRDL's Bacteriology Section: (L-R) Tracy Irion, Lab Technician; Lucinda Bloker, Microbiologist; Lacey Quail, Student Worker; Seema Das, Research Associate II; Erin Johnson, Student Worker; Cindy Watt, Microbiologist; Larry Holler, Professor and Section Leader; Cindy Troelstrup, Lab Technician; and Deb Murray, Senior Microbiologist.

Dr. Holler has a Bachelor's degree in microbiology and DVM from Kansas State University preceding his PhD from Washington State University. His bacteriology experience includes work in the K-State bacteriology laboratory during school years, in addition to work as a Research Associate in bacteriology at the University of Wyoming, and as a consultant to the bacteriology lab at Washington State University. Along with his section leader responsibilities, Dr. Holler coordinates reproductive and mastitis cases in his role as a pathologist within the ADRDL. He currently serves on the SDSU Academic Senate. Dr. Holler also assists veterinarians and producers with questions on sheep and goat medicine and has presented programs nationally on those topics.

Research Associate II: Seema Das B.Tech., MS, with a B.Tech degree in dairy technology and an MS degree in biological sciences/dairy manufacturing specialization, handles the mastitis and

bulk tank milk samples for the bacteriology lab. She has worked at SDSU for a total of eleven years, two in the Dairy Science department, and the past nine years at the ADRDL. In addition to those duties, and regular diagnostic bacteriology, Seema is the bench leader, quality control coordinator for the section, and assistant quality manager for the ADRDL. She is responsible for aquatic diagnostic cases and aquatic health screening cases and assists in new test development and validation. She is also PI for Veterinary Laboratory Investigation Response Network grants, performing research work with *Salmonella* in dog feces and working on validating PCR method with mouse droppings and raw pet food.

Senior Microbiologist: Deb Murray CLT is responsible for antimicrobial sensitivity testing of bacterial isolates within the section. She has a degree in laboratory technology and has been with the ADRDL for 18 years. Deb also

is the coordinator for hazardous materials shipping, anaerobic bacterial isolation, works with mastitis cases and Brucella isolation and identification, in addition to her responsibilities for general diagnostic pathology.

Microbiologists: Cindy Watt BS has a Bachelor's degree in microbiology from SDSU. She has 15 years of experience in

the SDSU ADRDL bacteriology section and has responsibilities for diagnostic bacteriology and management of routine cultures. She is also responsible for John's and mycology cases. She has played a key role in maintaining the section's proficiency in John's Disease diagnostics by coordinating proficiency tests for that organism.

Lucinda Bloker started her new position as a microbiologist within the Bacteriology Lab in February. Lucinda, originally from Lake Benton, MN, has Bachelor's degrees in Psychology and Microbiology from SDSU. She most recently worked at SGS, as well as RTI in Brookings. Her responsibilities have increased rapidly since starting at the ADRDL, and

Bacteriology (Continued on page 7)

MALDI-TOF Technology Speeds Bacteriology Results

Seema Das, Russ Daly

Bacteriologists have the task of not only choosing the proper techniques and materials for culturing pathogenic bacteria, they also have to apply biochemical and physical evaluations to the organisms grown so that a proper identification can be made. This can be a time-consuming and sometimes subjective process.

Technology has entered the world of bacteriologic identification in several different ways. This past spring, the SDSU ADRDL has jumped into this world by purchasing and installing a MALDI-TOF/MS instrument, and it is already paying off dividends to clients who are experiencing shorter turnaround times with bacteriology results.

MALDI-TOF/MS stands for Matrix Assisted Laser Desorption Ionization-Time of Flight/Mass Spectrometry. This mouthful of terms describes an instrument that uses mass spectrometry to identify proteins specific to a certain bacterial strain.

Mass spectrometry utilizes the measurement of ionized particles. For many years, mass spectrometry has been ap-



A 96-sample plate is placed into the MALDI-TOF/MS instrument. Each filled-in circle on the plate represents a mixture of matrix substance and bacterial colonies for identification. The metal lid will then be shut and the instrument will begin the analysis.

plied primarily to volatile compounds, such as certain chemicals, because molecules needed to be in a gaseous phase in order to be ionized. Large polar, non-volatile molecules such as proteins could not be measured in this way until the development of MALDI technology. This is a "soft ionization" technique that leaves protein molecules relatively intact.

This process is made possible by mixing the bacterial sample with a "matrix" substance and allowing the mixture to dry on a plate. This matrix buffers the sample and prevents its decomposition. The plate is then placed into the machine. A single plate can hold 96 samples at a time. Once in the machine, the matrix/bacterial combination is hit with a laser. The matrix absorbs energy from the laser, and transfers it to the bacteria, which "desorb" and form singly charged ions.

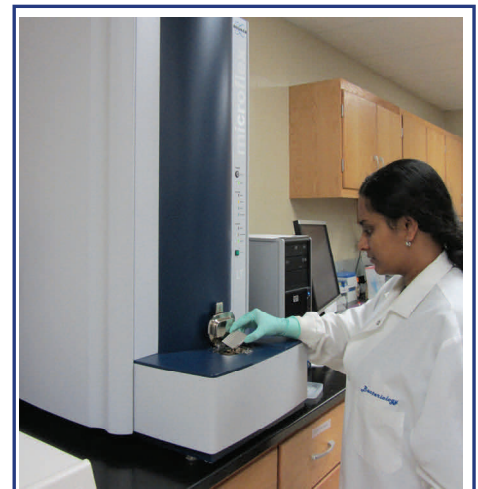
The mass of the ions is analyzed by allowing them to travel upward through a "flight tube." The lighter ions travel faster and are detected earlier than heavier ions. The result is the generation of a mass spectrum graph that plots mass-to-charge against signal intensity. This graph represents a specific "fingerprint" for a specific bacterial species. This mass spectrum is then compared by computer software with a databank of already-characterized bacteria.

The entire process takes only minutes, and has resulted in timely, accurate bacterial identification. The process can be used for all bacteria, whether aerobic or anaerobic, and even can be used for fungal species. Besides timeliness and accuracy, the consumables used with MALDI-TOF/MS technology are less expensive than traditional biochemical identification methods. On a laboratory basis, the technology means that diagnostic workflows can be more productive and new research opportunities can be opened up.

For bacterial cultures in which antimicrobial sensitivity testing is performed, traditional methods of sensitivity testing will still be used (currently the MALDI-TOF/MS instrument does not differentiate bacterial strains based on antimicrobial sensitivity). However, research is currently underway that may result in immediate serotyping of Salmonella isolates, a process currently provided by NVSL. The technology opens up many new doors for advances in mycology, mycobacterium identification, and environmental sampling.

Please contact the ADRDL at 605-688-5171 if you have any questions about this exciting new technology.

For further information on MALDI-TOF/MS, visit <http://www.mayomedicallaboratories.com/articles/hottopics/transcripts/2012/02-bact-id/index.html> ■



Seema Das, Bacteriology Research Associate, places a sample plate into the MALDI-TOF/MS instrument at the ADRDL.

New Hires at the ADRDL

Tammy Englin joined the ADRDL team this fall as one of the secretaries in the back receiving office. Tammy brings with her over 25 years of experience in customer service at both the store and corporate levels. Her most recent position was that of working with grain export customers at SGS in Brookings. Tammy lives north of Bruce with her husband. They have four grown children with the youngest a freshman in college. Tammy's family is involved with 4-H and are huge supporters of FFA, raising and showing club lambs and shorthorn club calves.



Amanda Sondag is the latest addition to the Animal Resource Wing (ARW) team. Amanda graduated with an AAS degree in Veterinary Technology from Ridgewater College in Willmar, MN in 2009. She is a Certified Veterinary Technician in Minnesota and is awaiting her certification in South Dakota. Amanda's work experiences include companion animal veterinary clinics; Jennie-O as a production worker, certi-

fied veterinary technician, lab, and research; and RTI working with cattle, chickens and pigs. Her position is that of Lab Technician at the ARW, where she is responsible for animal care and duties such as injections, blood collections and anesthesia monitoring. She also helps direct student labor, building management, and clerical duties. ■

Use Computer Spreadsheets or Word Processing for Large Sample Submissions

Are you sending a large submission with many samples? A real time-saver for you and your staff might be submitting the sample ID's via a spreadsheet (e.g. Excel) or word processing program. (e.g. Word).

Compared to writing sample ID numbers into a paper form, submitting them electronically means that errors in transferring numbers and in interpreting writing are minimized. Use of Excel is also extremely convenient when clients are using RFID technology.

Once the ID's are entered into a spreadsheet, one can paste them into the "Electronic Submission: All Species Herd Health" form found on the ADRDL website at: <http://www.sdstate.edu/vs/adrdl/forms/upload/All-Species-Herd-Health-Form-Electronic-Submissions-Only-2.xlsx>, or simply save the Excel file with a file name that identifies the owner. This system has worked better for most clients compared to the "Additional ID# form" found on the website, as that creates a pdf file that can be printed, but not saved for use electronically.

Alternatively, if you are more comfortable with word processing programs (e.g. Microsoft Word), you can create a table within the word document and fill the table cells with ID numbers.

E-mail the completed spreadsheet or document as an attachment to sdsu.adrdl@sdstate.edu. You will still want to include a hard-copy submission form (without individual ID's) that includes the name of the file that was sent via e-mail, or some other method that ensures the samples are matched up with the Excel file.

Many submitters are using this system currently and it has created advantages for clients and lab personnel alike, resulting in better turnaround time and accuracy of reporting. If you have any questions about submission of samples, please call us at 605-688-5171. ■

Tularemia in a South Dakota Cat

D. Miskimins, R. Daly, SDSU

A deceased five year old castrated male cat was submitted to the SDSU ADRDL in October 2013 for a necropsy examination. This cat was seen by a southeast South Dakota veterinary clinic because of a rapid onset of lethargy, vomiting, fever of 105+ F, profound leucopenia, oral ulceration, excessive salivation, and dehydration. Radiographs revealed splenomegaly. Clinical chemistry examinations demonstrated elevated BUN and USG 1.050+. A single dose of pradofloxacin was administered along with subcutaneous fluids, but the cat died 24 hours later.

Necropsy examination revealed splenomegaly with miliary caseous abscesses. The ileocecal lymph node was obviously enlarged. Microscopic examination of the spleen and lymph node revealed severe acute multifocal necrotizing splenitis and lymphadenitis. *Francisella tularensis* was isolated from spleen and lymph node.

In animals, Tularemia may present with a wide variety of clinical signs. In cats (the most common animal to show clinical signs), the infection may show as a mild illness with swollen lymph nodes and fever or a severe overwhelming infection and death. A detailed report by Drs. Daly and Miskimins can be found at: <http://www.sdstate.edu/vs/extension/pets/upload/Tularemia-in-SD-animals-July-2009.htm>

Tularemia is a highly infectious disease that can affect humans as well as animals. Symptoms in people depend on the route of exposure. Percutaneous infections result in a skin ulcer at the point of introduction along with fever and lymphadenopathy. Inhalation may result in pneumonia, while ingestion results in severe pharyngitis and regional lymphadenopathy. A recent CDC MMWR report on Tularemia (http://www.cdc.gov/mmwr/preview/mmwrhtml/mm6247a5.htm?s_cid=mm6247a5_e) noted that between 2001 and 2010, South Dakota was the state with by far the highest incidence rate of tularemia in humans (table)

Tularemia is an annual occurrence in animals and/or people in South Dakota. It is important to be familiar with the signs and diagnosis of the disease to adequately treat patients and inform owners. ■

TABLE. Six states with the highest incidence of human tularemia — United States, 2001–2010

State	Total no. of reported cases	Incidence*
South Dakota	65	0.84
Arkansas	162	0.58
Wyoming	29	0.57
Missouri	231	0.40
Nebraska	55	0.31
Oklahoma	108	0.30

* Incidence calculated as reported cases per 100,000 persons per year (Source: CDC)

Bacteriology (Continued from page 5)

include mycoplasma culture, *Clostridium difficile* ELISA and Clostridium FA testing, as well as routine diagnostic bacteriology.

Laboratory Technicians: Cindy

Troelstrup has been with the ADRDL bacteriology section since July 2009. Her role as a laboratory technician involves preparation of media, reagents, buffer, etc. not only for the bacteriology section, but also for the other sections and the research component of the ADRDL. She also helps maintain the lab's quality system by monitoring equipment temperatures and maintaining a database for quality control organisms. Her recent reorganization of the media preparation section has added greatly to the quality of work done at the ADRDL. Cindy also is a member of the ADRDL safety committee.

Tracy Irion has responsibilities within the kitchen in cleaning and autoclaving equipment and materials used within the section, including glassware, tubes and other materials. He assists this section and others by filling tip boxes and dilution plates. He has been responsible for checking equipment temperatures and eye wash stations for serology, PCR, and food safety sections. He also coordinates and organizes ADRDL laundry room activities. Tracy has 20 years of service in the media preparation section at the SDSU ADRDL.

Student help: Lacey Quail is from White, SD and attended Deubrook Area High School. She is a sophomore at SDSU in the Pre-Veterinary Medicine program while majoring in Animal Science. She is involved with Pre-Vet Club, Little International, Honors College, Collegiate FFA, and the American Society of Animal Science. Lacey has worked for ADRDL for one and a half years.

Erin Johnson is from Brookings, SD and attended Brookings High School. She is a freshman at SDSU and is currently studying Spanish. She is very active in anything musical. Erin started working at the lab after graduating from high school.

Questions about bacteriology techniques, cultures, and sampling can be directed to the bacteriology section at (605) 688-5171. ■

Animal Health Effects of October West River Blizzard noted at ADRDL

By Russ Daly, DVM, SDSU

While veterinarians and producers did not place a high priority on submitting samples from animals lost in the remarkable blizzard event that hit western South Dakota October 3-5, 2013, the SDSU ADRDL did receive several cases that exemplified the severe challenges faced by animals that perished in the blizzard.

Death losses of up to 30,000 have been estimated as a result of the storm. Animals died for a number of reasons, significantly exhaustion and entrapment in mud, fences, and waterways. A common observation of many producers and veterinarians was the copious amounts of fluid running from the nose and mouth of dead animals when they were moved. Pulmonary edema was observed in ADRDL submissions from cattle impacted by the blizzard, and was likely a contributor to death in some of the animals under extreme exhaustion and stress. In these cows, left sided heart failure was likely involved.

The pathogenesis of left-sided heart failure in these cattle would begin as the body's sympathetic nervous system responds to cold environmental temperatures. This response activates a specific hormonal pathway (the renin-

angiotensin-aldosterone system) which serves to increase blood pressure throughout the body. Since the left ventricle of the heart is charged with pumping blood to the systemic circulation, under conditions of high blood pressure, the heart must work harder to pump against the higher pressure. When the left side of the heart can no longer effectively pump blood, the blood backs up into the lungs. The resulting hydrostatic pressure in the small blood vessels of the lungs means that fluid is forced out of the bloodstream into the lung tissue itself and eventually the alveolus, resulting in fluid entering the airways. This will be seen as fluid pouring out of the lungs at death. In these animals the ultimate cause of death may have been the fluid buildup in the airways due to heart failure.

In addition to the direct death losses from the storm, producers and veterinarians observed conditions such as bloating, pinkeye, and tetany in cattle that survived the storm. A full analysis of these conditions can be found at <http://www.rangebeefcow.com/2013/newsroom.html#.UrRe8OJ0IF8> ■

Continuing Education Events

January 23-25, 2014

Montana VMA Winter Meeting
Bozeman, MT, www.mtvma.org

February 7 & 8, 2014—James Bailey Herd Health Conference,
South Dakota State University, Brookings, SD
www.sdvmed.org

February 16-20, 2014

Western Veterinary Conference
Las Vegas, NV, www.wvc.org

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Animal Health MATTERS

The SDSU Veterinary and Biomedical Sciences Department conducts research, teaching, professional service, and extension service to South Dakota and the surrounding region. An entity within the SDSU Veterinary and Biomedical Sciences Department, the South Dakota Animal Disease Research and Diagnostic Laboratory is a full-service, all-species diagnostic laboratory accredited by the American Association of Veterinary Laboratory Diagnosticians (AAVLD). The AAVLD accreditation program complies with international expectations for quality diagnostic services under the guidance of the World Organization for Animal Health (the OIE). The ADRDL collaborates with the USDA National Veterinary Services Laboratory on many federal disease monitoring and eradication programs and is a member of the National Animal Health Laboratory Network. For information regarding the laboratory's Quality System, contact Rajesh Parmar – ADRDL Quality Manager, at 605 688 4309.

Editor: Russ Daly, DVM

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