



profiles

Fall 2015/Winter 2016 \ College of Veterinary Medicine



A CLOSE-UP LOOK AT
**ANTIMICROBIAL-
RESISTANT
BACTERIA**

How CVM researchers are tackling
this global threat



UNIVERSITY OF MINNESOTA

College of Veterinary Medicine

Driven to DiscoverSM

 ...from the **DEAN**

With the holidays just around the corner, it is a time to reflect upon the past year and our accomplishments.

One hundred DVM, nine PhD, and four MS students completed their studies with us in the past year. The college benefited from their skills and expertise while they were with us, and as these remarkable individuals embark on their careers, I have no doubt that the world will benefit as well.

The avian influenza outbreak that affected several million turkeys in Minnesota last spring was a devastating loss for farmers and producers in the state. College of Veterinary Medicine faculty and staff helped state agencies respond, utilizing the measures they had helped develop over the last 10 years in anticipation of such an outbreak. Our researchers assisted the industry and continue to do so, and our diagnostic laboratory responded with extra shifts seven days a week to give farmers the answers they needed. Each day this fall, I am grateful that the virus has not returned and thankful to my colleagues for their fine work.

In this issue of *Profiles*, we showcase our research in the area of antibiotic resistance. Drug-resistant bacteria is a health risk affecting humans and animals, and College of Veterinary Medicine researchers are investigating how antibiotics and other antimicrobials add to drug resistance in food animals.

This issue also explores the contributions that graduate students make to our research mission—not only in Minnesota, but throughout the world. We tell the stories of five graduate student researchers and their work in the areas of cancer, avian influenza, ecosystem health, veterinary vaccines and immunology, and bovine health.

We also share the story of a cat and dog that benefited from the generosity of donors who contributed to the Shelter and Rescue Animal Fund. Thanks to these folks and the efforts of our Veterinary Medical Center team, Firecracker and Yvonne have a second chance.

My thanks to you for your continued support of the College of Veterinary Medicine. I wish you and your family all of the joys of the holiday season.

Sincerely,



TREVOR AMES
DEAN



 **profiles**

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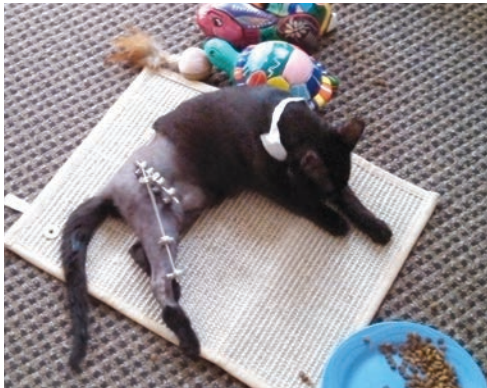
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Reducing the threat of antimicrobial-resistant bacteria

College of Veterinary Medicine researchers are working to understand and confront this global public health threat.

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Thanks to the Veterinary Medical Center's Shelter and Rescue Animal Fund, Yvonne and Firecracker received lifesaving surgery and are now in loving homes.



◆ SERVICE

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Veterinary Medical Center adds services, plans expansion

Now offering urgent care, the Veterinary Medical Center plans to open a new Primary and Urgent Care Center next year.

◆ TEACHING

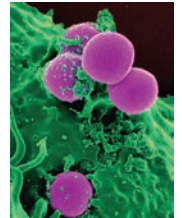
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Advancing research: How graduate students make a difference

Five graduate students discuss their research projects in the areas of cancer, avian influenza, ecosystem health, veterinary vaccines and immunology, and bovine health.

ON THE COVER:

A scanning electron micrograph of a human neutrophil (a type of white blood cell) ingesting methicillin-resistant *Staphylococcus aureus*, a bacteria that is resistant to many antibiotics.



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NEWS notes

HIGHLIGHTS FROM THE COLLEGE OF VETERINARY MEDICINE



TRC volunteer Sue McCarthy shows Artemis, a peregrine falcon, to visiting students as clinical intern Dr. Irene Galan Lecona discusses a case with Dr. Patrick Redig, cofounder, and Dr. Julia Ponder, executive director, who holds Pi, a bald eagle. See an interactive version of this photo at give.umn.edu.



Photo by Sue Kirchoff

Dr. Julia Ponder, right, executive director of The Raptor Center holds a peregrine falcon as she joins members of the Dayton family at the grand opening of the Douglas Dayton Educational Wing.

The Raptor Center has a new wing

The Raptor Center hosted a donor open house and ribbon-cutting ceremony for the grand opening of the new Douglas Dayton Education Wing on September 24. In addition to the members of the Dayton family, guests included University of Minnesota President Eric Kaler and his wife, Karen Kaler, and College of Veterinary Medicine Dean Trevor Ames and his wife, Kathy Ames. The festivities included tours of the new wing, tours of the clinic, and flight demonstrations with TRC's education birds.

Photo by Steve Niedorf

Education Day celebrates excellence in education

The college's annual Education Day, held on May 29, included poster presentations, speakers, and an awards ceremony, where faculty and staff were recognized for excellence in teaching. Awards included:

- Zoetis Distinguished Teaching Award: Dr. Christie Ward
- Veterinary Clinical Sciences awards: Teaching Award, Dr. Jody Lulich; Clinical Teaching Award, Dr. Chris Stauthammer; Clinical Teaching Resident Award: Dr. Lisa Gorman

- Veterinary Population Medicine awards: Teaching Award, Dr. Christie Ward; Clinical Teaching Award, Dr. Michael Maher; Teaching Resident Award, Dr. Fernando Amitrano
- Veterinary and Biomedical Sciences Teaching Award: Dr. Randy Singer
- Veterinary Medical Center Technician Teaching Awards: Brandon Hatten (Small Animal Hospital) and Amber Dargis (Large Animal Hospital)



Peter Davies and Randall Singer appointed to Presidential Advisory Council

The U.S. Department of Health and Human Services, U.S. Department of Agriculture, and U.S. Department of Defense announced the appointment of 15 nationally recognized experts to the Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria on September 15. Two of them were University of Minnesota College of Veterinary Medicine faculty members: Dr. Peter Davies and Dr. Randall Singer.

A professor in the Veterinary Population Medicine Department, Dr. Peter Davies is a veterinary epidemiologist specializing in infectious diseases of food animals, particularly swine. His professional experience includes several years of clinical practice; government regulatory work; two years as a livestock advisor on an international development project in Brazil; and senior academic positions in swine medicine and veterinary public health. Dr. Randall Singer, a professor in the Veterinary and Biomedical Sciences Department, has experience investigating the emergence, persistence, and dissemination of antibiotic resistance. His systems approach to the topic has resulted in work with a diverse set of organizations and stakeholders, including veterinary and human medical, agricultural, public health, pharmaceutical, and consumer advocacy interests.

Established by executive order, the advisory council will provide advice, information, and recommendations to the U.S. Department of Health and Human Services on programs and policies related to combating antibiotic-resistant bacteria.



Photo by Sue Kirchoff

Dr. Sylvia Wanzala, postdoctoral associate, discusses her Research Day poster with Dr. Mark Rutherford, associate dean for graduate programs, and Dr. Lisa Herron-Olson, a CVM alumna who is now chief operating officer and director of science and business development at Syntiron, a St. Paul, Minnesota, research and development company.

Awards presented on Research Day

The college's annual Points of Pride Research Day on October 7 included poster presentations, seminars, award presentations, and a reception.

Dr. Randy Singer, professor in the Veterinary and Biomedical Sciences Department, received the Zoetis Award for Research Excellence.

Dr. James Lokensgard, professor in the Department of Medicine's Division of Infectious Disease and International Medicine at the University of Minnesota Medical School, received the Distinguished Research Alumnus Award.

The U.S. Department of Agriculture's Animal Health and Plant Health Inspection Service Veterinary Services received the Distinguished Partner Award.

The Mark of Excellence in Research Award was presented to Dr. Fekadu Kassie, associate professor of oncology in the Veterinary Clinical Sciences Department.



Dr. Randy Singer, center, was presented with the Zoetis Award for Research Excellence by Dr. Al Beitz, left, and Dean Trevor Ames.



International Conference on One Medicine One Science planned for April 24-27

The College of Veterinary Medicine will again host the International Conference on One Medicine One Science (iCOMOS), which it originated in 2014. Presented in partnership with the University of Minnesota and national and international agencies, the conference is a forum to explore the role of science in pressing health issues at the interface of humans, animals, and the environment. The conference will take place at Minneapolis's Commons Hotel April 24-27, 2016.

iCOMOS will focus on the health policy balance between personalized medicine and public health, emphasizing the impacts of air contamination and water quality on humans and animals at individual and population levels, as well as the role of science in local and global health policy. A goal of the conference is to facilitate interdisciplinary collaborations across the world in economics, health, and science.

The conference and workshops will be of interest to human and animal healthcare professionals, trainees, environmental scientists, public health and chronic disease specialists, and policy experts in health, agriculture, food, and environmental affairs.

More than 300 participants from the United States and 13 other countries attended the first conference in 2014. That conference focused on infectious disease challenges and solutions at the animal-human-environment interface, and on meeting global food production challenges while preserving food safety and environmental security.

As a participant from Turkey said after the inaugural conference, "I still carry my excitement and cannot wait to transfer the ideas and projects from both the conference and my meetings with participants. This conference will not only lead to innovations in the field of exact science, but also innovations in the field of ethics."

Registration for this year's conference is now open. Visit www.icomos.umn.edu for more information.

New partnership with University of Prishtina

April marked the official launch of a partnership between the University of Minnesota and the Faculty of Agriculture at the University of Prishtina in Kosovo. Represented by faculty members from the Center for Animal Health and Food Safety, the University of Minnesota is partnering with the University of Prishtina to conduct a series of workshops and short courses in Kosovo, as well as hosting teaching faculty from the University of Prishtina for faculty development fellowships.



Photo by Sue Kirchoff

Veterinary students from Chiang Mai University in Thailand join students participating in a public health rotation on a visit to Hammond Honey Farm in Wisconsin.

Chiang Mai students, advisers visit Minnesota

Five veterinary students and two advisers from Chiang Mai University in Thailand visited Minnesota for three weeks in July as part of the college's veterinary education twinning program. Experiential education sessions included visits to Lorentz Meats in Cannon Falls, Coastal Seafoods in Minneapolis, Hammond Honey Farm in Wisconsin, the Minnesota Department of Health, the Minnesota State Capitol, and more. In August, five University of Minnesota veterinary students, along with Dr. Tina Clarkson, assistant professor, and Dr. Jessica Evanson, veterinary resident, traveled to Chiang Mai University. The twinning program is part of the World Organisation for Animal Health (OIE) Veterinary Education Twinning Project.



Students awarded degrees at annual commencement ceremony

DVM, PhD, and MS degrees were awarded at the college's annual commencement ceremony at Ted Mann Concert Hall on May 9. After short talks by Eric Kaler, president of the University of Minnesota; Dr. Tucker LeBien, associate vice president for research, Academic Health Center; and Dr. Trevor Ames, dean of the College of Veterinary Medicine, the commencement address was presented by Dr. Jeffrey Klausner, former dean of the college, and Nikko Grossapoulos presented the response from the class of 2015. A total of 100 DVM degrees, nine PhD degrees, and four MS degrees were presented.

Bonding bill passed in special session; funding provided for veterinary isolation lab

When the Minnesota Legislature convened for a one-day special session on June 12, it passed six bills—including the bonding bill, which allotted \$18 million for the Veterinary Isolation Laboratories and \$8.5 million for the Minnesota Poultry Testing Laboratory in Willmar, and the agriculture bill, which provided almost \$13 million for University agriculture research, education, extension, and technology transfer, including \$2 million for avian flu research. Governor Mark Dayton signed all six bills into law on June 13.

Minnesota Urolith Center celebrates 1 millionth stone

The Minnesota Urolith Center is celebrating the analysis of its millionth urinary stone (urolith) since it set out to reduce the worldwide incidence of urinary disease in companion animals and enhance the veterinary and nutritional care of pets with urinary tract disorders. With longtime support from Hill's Pet Nutrition, Inc., the Minnesota Urolith Center is able to deliver an analysis service to veterinarians around the world. The 1-millionth stone came from a 4-year-old neutered male Shih Tzu named Snickers, who was treated at Dogwood Animal Hospital in Fayetteville, North Carolina.



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Reducing the threat of ANTIMICROBIAL- RESISTANT BACTERIA

By Fran Howard

Drug-resistant bacteria cause 23,000 human deaths and 2 million illnesses each year in the United States alone, according to the Centers for Disease Control and Prevention. That's why the College of Veterinary Medicine (CVM) is on the front line of attack against the growing worldwide public health threat of drug-resistant bacteria in humans and animals.

Since the mid-1900s, antibiotics, a type of antimicrobial, have been used to prevent and treat bacterial diseases. Antibiotics are widely used in human medicine, veterinary medicine, beekeeping, and plant cultivation to fight disease-causing

pathogens, and they need to remain available for use when disease strikes.

One of the most important strategies to reduce antibiotic resistance is to promote responsible antibiotic use across species. Researchers worldwide—including those at the CVM—are working to develop strategies and guidelines for safe and responsible use of antibiotics and to identify alternative treatments in both human and veterinary medicine.

CVM professors and epidemiologists Dr. Randall Singer and Dr. Peter Davies have been asked to serve on the 30-member Presidential Advisory Council on Combating Antibiotic-Resistant

Bacteria. The committee is tasked with developing a research-driven plan to identify and coordinate action among federal agencies to prevent and control outbreaks of resistant pathogens.

“The involvement of Randall Singer and Peter Davies in the Presidential Advisory Council is a reflection of the college's leadership in research on antibiotic-resistant bacteria,” says Dr. Trevor Ames, dean of the College of Veterinary Medicine. “They are two of the four veterinarians on the council, and they are important members of the college's research team, which is working diligently to solve problems related to antibiotic resistance.”

The debate about whether and how much of a role antibiotic use in veterinary medicine plays in the development of resistant bacteria affecting humans has been a long one. For now, though, the U.S. Food and Drug Administration (FDA) is phasing out the decades-long use of medically important antibiotics for growth promotion in the beef, poultry, and swine industries.

In 2013, in response to an FDA request, veterinary pharmaceutical companies agreed to voluntarily revise the FDA-approved use conditions on the labels of veterinary antibiotics to remove growth-promotion indications by January 1, 2017. The FDA also put all use of medically important antibiotics in feed or water under veterinary oversight beginning in 2017, meaning producers will no longer be able to buy these products over the counter but instead will need a prescription from a veterinarian.

Much of the research on antibiotic resistance occurring at the college revolves around four areas: determining how on-farm uses of antibiotics are adding to resistance, looking for alternative treatments in anticipation of increased bacterial infections once growth-promoting antibiotics are banned, understanding human risks of exposure to resistant organisms, and identifying how resistance spreads.

Determining appropriate on-farm use

CVM researchers are taking a close look at how antibiotics and other antimicrobials add to drug resistance.

“Agricultural antibiotic use can influence resistance in specific bacterial populations, and it is now well-documented that nonantibiotic compounds such as disinfectants and metals can also significantly impact the prevalence of resistant bacteria,” says Singer.

The challenge for Singer and other researchers, however, is determining which practices are most responsible for the emergence, amplification, persistence, and dissemination of antimicrobial resistance in food

animals, and then accurately predicting the net benefit to human health that modification or elimination of these practices would have.

For instance, while it is commonly assumed that the elimination of antimicrobial growth promoters from poultry and other food animal production systems will help solve the problem of antibiotic resistance, Singer says that eliminating these low-dose antibiotics might help reduce some resistance in some bacteria, but it likely will also cause system-wide disruptions, such as increased disease outbreaks—which could create the need for treatments with even higher doses of medically important antibiotics.

“The assumption is that lower doses given on a regular basis are worse than higher doses given to treat active infections,” says CVM associate professor and microbiologist Dr. Tim Johnson. To find out whether that premise is true, Johnson, Singer, Davies, and professor and microbiologist Dr. Richard Isaacson conducted a controlled study of pigs given varying doses of tetracycline and inoculated with the same nonpathogenic *E. coli*. The research team then tracked the selection of the *E. coli* and the movement of the resistance-carrying plasmid—the DNA molecule within bacterial cells responsible for transferring resistance—to other bacteria in the pigs’ gastrointestinal tracts.

“We went into the experiment expecting both the low-dose and the high-dose antibiotic treatments to increase resistance,” says Johnson. “To our surprise, that didn’t happen. It only happened with the high-dose treatment group. The low-dose treatment had zero effect on resistance-carrying plasmids.”

In other words, the high-dose treatment of tetracycline caused the resistance-carrying plasmid to move into other strains and species of bacteria, increasing the overall number of resistant bacteria. Thus, as low-dose antibiotic use is eliminated from animal agriculture, Johnson says that bacterial infections



“It is now well-documented that nonantibiotic compounds such as disinfectants and metals can also significantly impact the prevalence of resistant bacteria.”

—DR. RANDALL SINGER



“For producers and veterinarians, antibiotics are an important part of managing pig health and welfare.”

—DR. PETER DAVIES

could increase, requiring even more use of therapeutic doses of antibiotics—which in turn could hasten the spread of antibiotic resistance.

Similarly, Isaacson looked for six resistance genes from pigs receiving low-dose antibiotics compared to pigs receiving no antibiotics. There was no difference in antibiotic gene carriage, suggesting that low-dose antibiotics were not selecting for resistance.

“Strategies to mitigate antibiotic resistance must be assessed for unintended consequences, both positive and negative, throughout the production system so that the net benefits can be evaluated and compared prior to adoption,” notes Singer.

Singer is leading an industry effort, funded by the U.S. Poultry

and Egg Association, to collect antimicrobial usage data from the poultry industry.

“What we want to understand is how these different compounds are being used, how much of them are being used, and for what purpose,” Singer says, “Data will be collected every six months, and we will look at how use is changing over time to establish trends and make predictions in usage patterns.”

With funding from the National Pork Board, Davies is leading a national initiative to look at options for obtaining reliable data on antimicrobial use in swine.

“For producers and veterinarians, antibiotics are an important part of managing pig health and welfare,” Davies says. “We are evaluating options to measure antibiotic use.”

Consequences and alternatives

CVM researchers also recently received a \$2.25-million grant from the USDA’s National Institute of Food and Agriculture to investigate ways to minimize antibiotic resistance throughout the poultry production system. Singer, who is the lead researcher on the three-year project, says that the timing of the research is critical because phasing out low-dose antibiotics will be a major change for the poultry industry.

“Given that efficient production of chickens has occurred in conjunction with these antibiotics over many decades, there will likely be system-wide disturbances that will require treatment with higher doses of antibiotics,” Singer says.

The research team hopes to learn how eliminating the use of low-dose antibiotics in chicken feed will affect antibiotic resistance and animal health and determine the financial impact on the industry.

“Through this research, we are trying to help the industry adapt to the coming changes related to antibiotic use as well as to educate

veterinarians on responsible antibiotic use in poultry,” says Singer.

Isaacson is looking at alternative treatments to enhance growth in food animals while not adding to antibiotic resistance.

“We would like to find a compound, nutrient, or something like probiotics that we could feed the animal that would do the same thing as growth promoters,” he says. By keeping the pig’s digestive system healthy, Isaacson hopes to reduce the number of infections and resulting therapeutic treatments of antimicrobials that scientists expect to see after growth-promoting antibiotics are eliminated in 2016.

One of his studies is designed to show that vaccinating pigs for *Lawsonia intracellularis*, a bacterium that causes pathological changes in the small intestine, appears to decrease the animal’s shedding of *Salmonella*, which is a normal flora of the pig but a human pathogen.

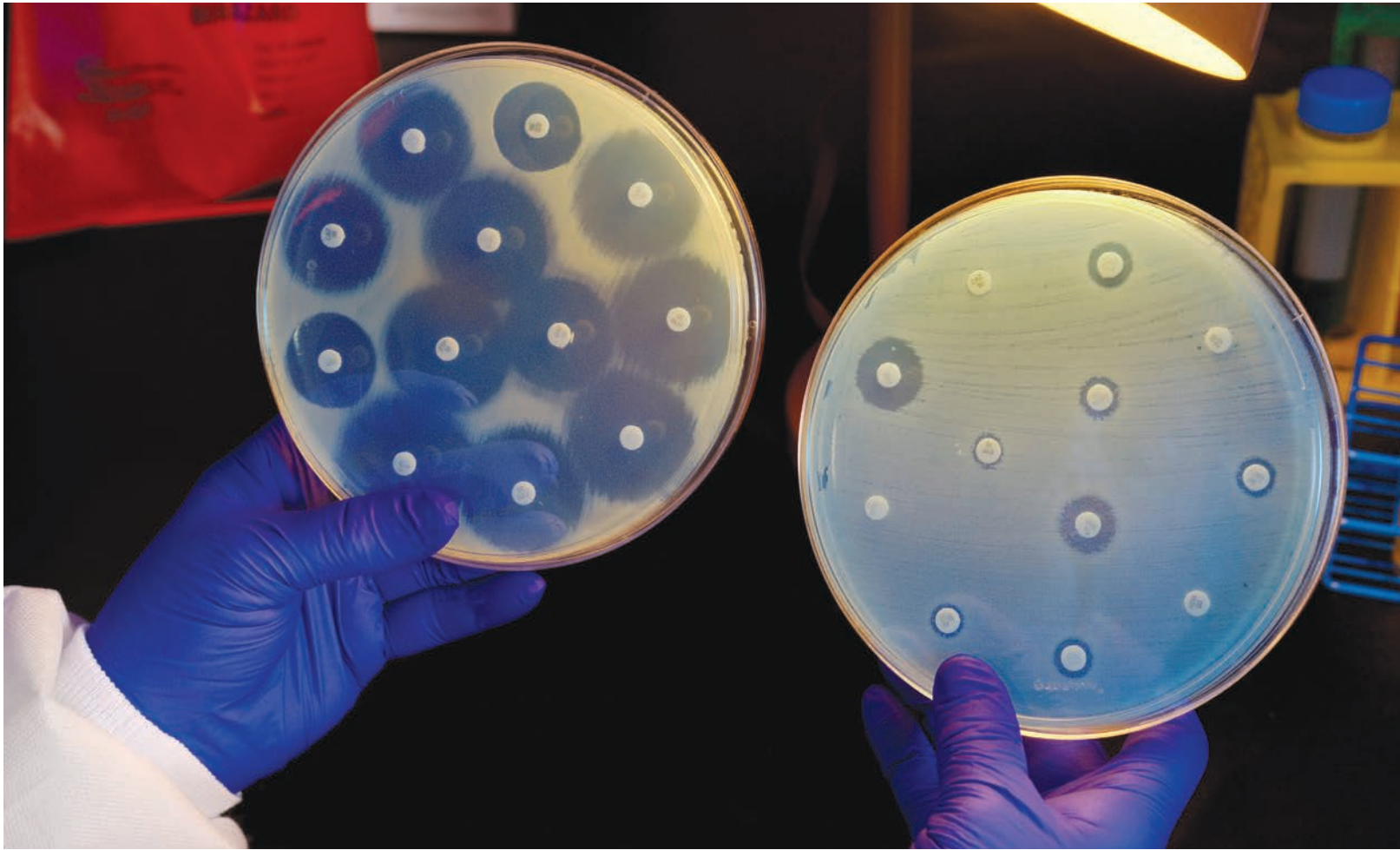
“Using vaccination rather than antibiotics doesn’t lead to resistance, and reducing or preventing *Salmonella* shedding through vaccination is good for the pig,” says Isaacson.

Johnson is working on a similar project in turkeys. Using genomics, Johnson is sequencing bacteria in the gastrointestinal tract of turkeys in an effort to identify the entire range of bacteria, from harmless flora to virulent pathogens. He hopes his work will eventually lead to the identification and recommendation of alternative treatments that promote growth in these birds.

“What happens in turkeys is not the same as what happens in pigs or humans,” says Johnson. “Different drugs have different uses, and spreading of resistance is different from drug to drug, animal species to animal species, and bacteria to bacteria.”

The role of companion animals

The issue of antibiotic resistance is not solely contained to livestock and poultry production. Companion



Dr. Peter Davies, Dr. Richard Isaacson, Dr. Tim Johnson, Dr. Randall Singer, and Dr. Jeff Bender.

CDC staff show two plates growing bacteria in the presence of discs containing various antibiotics. The isolate on the left plate is susceptible to the antibiotics on the discs and is therefore unable to grow around the discs. The one on the right has a drug-resistant germ that is resistant to all of the antibiotics tested and is able to grow near the disks. (Image courtesy of the Centers for Disease Control and Prevention)

animal medicine brings its own unique set of challenges, and the CVM and Veterinary Medical Center (VMC) have been leaders in this area as well.

“Due to our direct and intimate contact with pets, there is a real opportunity to share bacteria,” says Dr. Jeff Bender, professor, who is chair of the Infection Control Committee for the VMC and chair of the Task Force for Antimicrobial Stewardship in Companion Animal

Practice for the American Veterinary Medical Association.

“The types of antibiotics we use in pets are very similar to those we use in humans,” Bender says. “Given that animals can transfer antimicrobial resistance to humans and humans can transfer it to animals, there is a need to look at how we use antibiotics in companion animals. We have an enormous responsibility to be good antimicrobial stewards for the sake of our patient, the client, and the greater community.”

Bender and others at the college have been studying antibiotic resistance and infection control in companion animal populations for years. The Infection Control Committee monitors antibiotic-resistant infections at the VMC and has implemented a number of procedures and policies to reduce the spread of antibiotic resistance.

“The importance of infection control and which antibiotics to use are critical,” says Bender. “We developed both large- and small-



“We have an enormous responsibility to be good antimicrobial stewards for the sake of our patient, the client, and the greater community.”

—DR. JEFF BENDER

animal protocols, and we are more restrictive than many other veterinary teaching hospitals. We have policies in place to address antibiotic use as well as to limit the spread of antibiotic resistance.”

For instance, antibiotics critical to human health—such as imipenem and vancomycin—need an authorizing signature before they can be used at the VMC, and the attending clinician has to demonstrate a strong reason for choosing to use a restricted drug.

The human/animal connection

A few studies have addressed the direction of transmission, from animals to humans and from humans to animals, but more need to be done. An important pathogen in humans, methicillin-resistant *Staphylococcus aureus*, better known as MRSA, was first discovered in pig populations in 2004 in the Netherlands. While MRSA is not an important cause of disease in pigs, high levels of MRSA were also found in Dutch people working with pigs, but at the time, it wasn't clear if people were passing MRSA to pigs or if pigs were passing it to people.

In 2007, the first North American case of MRSA in a pig was diagnosed in Iowa, but to date no significant human health impact has been reported in the United States. As part

of the Upper Midwest Agricultural Safety and Health Center, Davies began an 18-month occupational health study of 66 swine vets in 15 states to determine the prevalence of MRSA and what variants (human or animal) of *S. aureus* and MRSA are found in U.S. veterinarians working with swine.

“We found that 65 percent of these vets were positive for *S. aureus*, compared with 30 percent of the overall population. About 9 percent were positive for MRSA, while only 1.5 percent of the general population is positive,” says Davies.

Davies also collected information on minor injuries sustained by these vets over the same time period, such as needle sticks, small cuts needing sutures, and bites. “There was a high level of minor injuries but no episodes of clinical infections,” he notes. “The vast majority of *S. aureus* in pig vet noses were of pig origin.”

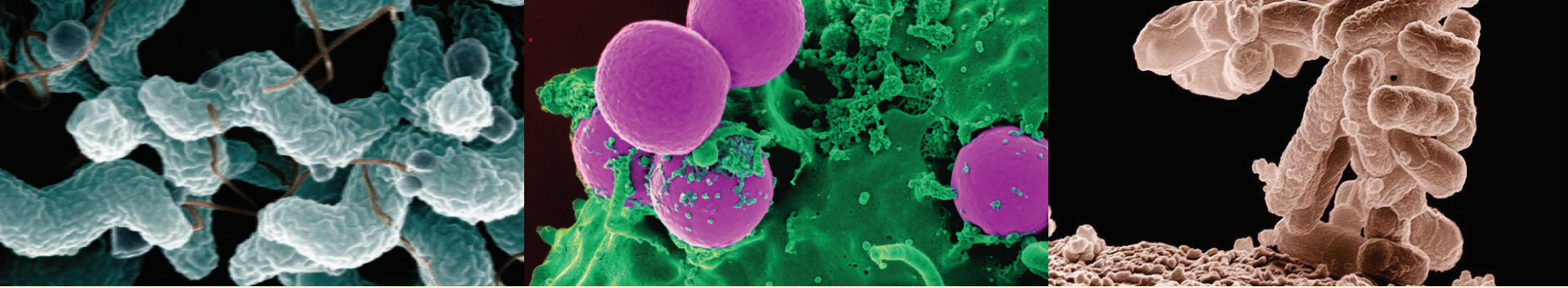
Davies notes that scientists now believe that the livestock-adapted variants of MRSA began in people. While a small number of elderly and severely compromised individuals have died from livestock-adapted variants of MRSA in Europe, human strains are four times more likely to be transmitted between people than livestock-adapted strains.

“There has been a 50-year debate on how significant the use

of antibiotics in animals is in the growing resistance found in human pathogens,” says Davies. “The data indicates the contribution is relatively small, but that is not an argument to not improve stewardship and manage antimicrobial use in the veterinary sector. It is difficult to justify the availability of over-the-counter antibiotics and medically important antibiotics for growth promotion—issues that are now being addressed. European experiences suggest that we won't see a marked impact on public health from discontinuing these uses—but we may see some animal health problems with the withdrawal of these uses that will require more therapeutic use of antibiotics.”

“The FDA has the authority to restrict the use of antibiotics if it deems it to be a threat to human health,” Singer adds. “The FDA has withdrawn one class of antibiotic from use in poultry and restricted the use of another in agriculture based on potential risks to human health and the need to maintain the efficacy of these valuable antibiotics for use in human medicine.” The FDA also sets mandatory withdrawal times for food animals treated with antibiotics before they can enter the food chain, and any meat or milk that tests positive for antibiotic residues above the set tolerance level is destroyed.

“We have a valuable tool box—an arsenal of antibiotics—and we need to use them as appropriately and responsibly as we can,” says Singer. “Antibiotics need to remain available and effective for use in veterinary medicine. It's an issue of animal welfare.” ◉



SPREADING RESISTANCE

We live in a sea of bacteria. In fact, for every mammalian cell in our bodies, there are an estimated 10 bacterial cells—make that 100 trillion bacterial cells in every human body. Most of these bacteria are normal flora that help keep us healthy and protect us from disease. Some, however, are dangerous pathogens waiting to strike.

To fight pathogenic bacteria, antimicrobials—compounds such as antibiotics, disinfectants, and sanitizers that kill pathogens—are widely used to keep plants, bees, animals, and humans free of infection. Overuse and sometimes indiscriminate use of antimicrobials have led to some bacteria becoming resistant to certain antibiotics. To compound the growing global problem, these bacteria can spread their resistance to other bacterial cells.

For the past decade, CVM microbiologist and associate professor Dr. Tim Johnson has been using bacterial genomics to discover how antibiotic resistance spreads from one bacterial cell to another. One culprit, he says, is the plasmid. Plasmids are small DNA molecules found inside bacterial cells.

“Plasmids are mobile and can spread between cells within a bacterial species, or even between cells of unrelated bacterial species,” Johnson says. “Plasmids that carry genes encoding drug resistance can spread them from cell to cell, strain to strain, and species to species.”

A single plasmid can carry—and spread—resistance for up to 10 antibiotics, notes Johnson. In fact, he adds, each time plasmids spread resistance, they spread the entire package. A plasmid that is resistant to three antibiotics, for example, will spread all three resistances, and one resistant to 10 antibiotics will spread to all 10.

“Our concern about resistance is that any time you use an antibiotic, you will have some level of selection for antibiotic resistance,” says CVM professor and microbiologist Dr. Richard Isaacson. And it doesn’t take long for bacteria to develop resistance. “Bacteria can alter themselves quickly,” notes Isaacson. “They grow rapidly. A human’s ‘doubling time’—until offspring—is about 20 or 30 years. Bacteria double in about half an hour.”

When these bacteria are exposed to something noxious, like an antibiotic, most die, but one or two might live and evolve to become resistant to the antimicrobial. “It can happen overnight,” says Isaacson.

In fact, Isaacson says, researchers can grow resistant bacteria overnight in the lab. They start with a culture of

up to a billion bacterial cells and spread them over an agar plate that contains an antibiotic. The next day, a couple of resistant bacterial colonies—with one gene mutation—will have survived.

It takes longer, however, for antibiotic-resistant bacteria to spread through a population of humans or animals. Any population of animals or humans has different rates and paths of person-to-person or animal-to-animal contact, and some individuals are healthy and some are not, making them more or less vulnerable to disease.

While these dynamics slow the spread of drug-resistant bacteria within populations, resistant pathogens can live for a long time inside their hosts without causing disease. Once they escape, they can create disease in their host or another victim of the same species—and more rarely in a victim of another species.

CVM researchers are studying how resistant bacteria, particularly clones, spread. Clones are bacteria that originated from a single ancestor of common origin. One

Overuse and sometimes indiscriminate use of antimicrobials have led to some bacteria becoming resistant to certain antibiotics.

recently discovered clone that Johnson is studying is a multidrug-resistant *Enterobacter cloacae* that likely began in Fargo, North Dakota, hospitals and then spread to other healthcare facilities in Fargo before moving down the I-94 corridor to hospitals and nursing homes in the Twin Cities. The plasmid in this particular *Enterobacter* has also moved and transferred its resistance into other bacteria, such as a global *E. coli* pathogen that causes urinary tract infections in humans.

“It’s the worst possible scenario,” Johnson says. Not only has this plasmid moved into a global pathogen, but it has also made a global pathogen even more dangerous. While researchers don’t know exactly how the pathogen is spreading from place to place, Johnson speculates that the movement of healthcare workers, who are carrying the bug asymptotically, could be one mechanism spreading the bacteria. ◊

HELPING HOMELESS PETS

A lifeline for cats and dogs

BY SUE KIRCHOFF



Every year, millions of dogs and cats are surrendered to animal shelters and rescue organizations. There, caring staff examine and provide needed treatment for each animal. But what happens when a shelter animal requires specialized surgery that's beyond the expertise of the shelter's veterinary team? What if an animal needs that advanced procedure not only to become someone's loving pet but to survive?

Thankfully, there is hope for at least some of those animals. Some have been helped by the Shelter and Rescue Animal Fund at the University of Minnesota Veterinary Medical Center. Firecracker and Yvonne are two of them.

Yvonne

Yvonne, a 10-week-old white mixed-breed puppy, came to the Coon Rapids Animal Humane Society (AHS) on June 23, 2015, all the way from an overcrowded shelter in Oklahoma. AHS knew nothing more than the puppy's age, sex, and breed—and the fact that a heart murmur had been detected at her original exam.

Puppies sometimes grow out of heart murmurs, so AHS staff members weren't too concerned until their own veterinarian examined Yvonne, noting a "grade 5-6 left-sided murmur," one of the most serious grades. Another AHS veterinarian performed an echocardiogram, which revealed mitral valve insufficiency that was likely associated with a patent ductus arteriosus (PDA). This was serious. Yvonne had a hole in her heart.

As frightening as it sounds, patent ductus arteriosus is the most common congenital cardiovascular defect in dogs. It meant that Yvonne had an opening between her pulmonary artery and her aorta, the two major blood vessels leading from her heart. The opening, called the ductus arteriosus, is a normal part of a puppy's circulatory system before birth that usually closes shortly after birth. If it remains open, however, it's called a patent (open) ductus arteriosus.

Left untreated, the condition can allow poorly oxygenated blood to flow in the wrong direction, weakening the heart muscle and causing heart failure. Without treatment, Yvonne would likely die of heart failure within a year.

AHS staff knew that treatment was available through the cardiology service at the University of Minnesota Veterinary Medical Center. With the procedure, Yvonne could be cured and find a home for life.

The key was finding a way to pay for the surgery, and the AHS had a possible option for that, too: They applied for help from the Veterinary Medical Center's Shelter and Rescue Animal Fund, a fund just for cases like Yvonne's.

Their application was accepted, and Yvonne was brought to the cardiology service for a cardiac evaluation and preoperative exam on August 6. Other than



Photo by Sue Kirchoff

(TOP) Yvonne's intake photo at the Coon Rapids Humane Society. The 10-week-old mixed-breed puppy came all the way from an overcrowded shelter in Oklahoma.

(BOTTOM) Veterinary student Lindsay Bush hugs Yvonne on the morning of her surgery on September 2. The anxious Yvonne was soothed by Bush, who plans to pursue shelter medicine after her graduation in May.



Yvonne with her foster family in Eagan, Minnesota, in October. From left are Laney, a 5-month-old former foster dog recently adopted by the family; Josephine, 11; Nicholas, 9; Yvonne; and Jennifer Johnson, a foster care provider for the Animal Humane Society. Laney and Yvonne have become fast friends and constant playmates. Photo by Sue Kirchoff.

the grade 5/6 (very loud) heart murmur, she was otherwise healthy and her vital signs were normal. Surgery was scheduled for the next month.

The PDA procedure was performed by board-certified veterinary cardiologist Dr. Chris Stauthammer on September 2. Once Yvonne was anesthetized, Stauthammer inserted a catheter into her femoral artery, a blood vessel in her inner right thigh, and passed it up to her heart. He then inserted a flexible mesh device called a duct occluder through the catheter and across the opening of the PDA. The occluder acted as a plug, blocking the opening between the pulmonary artery and the aorta. It trapped blood cells to form a clot that stopped blood from flowing into the pulmonary artery. During the procedure, Yvonne's vital signs were constantly monitored and she received intravenous antibiotics to prevent her from getting an infection.

The surgery went without a hitch, and Yvonne recovered quickly from general anesthesia. After she woke up, she received pain medication and more antibiotics while spending the evening in the Veterinary Medical Center wards.

The next morning, Yvonne returned to the cardiology service for an echocardiogram to make sure that the device was still in place. It was. There was no blood flow through the device, and the PDA was completely occluded, just what Stauthammer hoped to see.

No longer the timid pooch in the cardiology exam room, she is now an affable, energetic young dog.

Yvonne was released later that day and had a quick, pain-free recovery that would not have been possible if she had undergone an invasive, "open-chest" procedure. Instead, she had just a few sutures in her upper hind leg and a lifesaving device in her heart. Over about three months, her tissue will completely heal around the device and the occluder will become part of the rest of her cardiovascular system. After three months, when the danger of infection has passed, it will be safe for her to be spayed.

Today, Yvonne is a strong, boisterous, growing dog brimming with life. No longer the timid pooch in the cardiology exam room, she is now an affable, energetic young dog. Placed with a foster family in Eagan, Minnesota, she loves to romp around the home and yard she shares with Jennifer Johnson, her children Josephine, 11, and



HOW YOU CAN HELP

The Veterinary Medical Center (VMC) partners with shelters and rescue organizations with animals in need of treatments and surgeries that only the specialists at the VMC can provide. For some cats and dogs, it's the road to both a healthy life and a happy home.

Animals like Yvonne and Firecracker have benefited from generous donors who contribute to this important fund; however, the fund is in need of replenishing. Organizations look to the VMC for help with lifesaving and life-changing surgeries, and requests are always coming in from shelters and rescues.

"Our veterinarians appreciate being able to provide critical medical care that can enhance an animal's quality of life and may mean the difference between a dog or cat being adopted and getting a second chance in a loving home," says Dr. David Lee, hospital director.

The Animal Humane Society (AHS) has benefited from the medical care that the team at the VMC has provided to animals in AHS's care.

"The Shelter and Rescue Animal Fund gives animal welfare organizations access to an advanced level of medicine that normally isn't an option," says Dr. Graham Brayshaw, AHS's director of animal services. "Even organizations with access to veterinarians are helped with those cases that are beyond their expertise. Just this summer, this fund helped save the life of a puppy with a heart condition that is fatal if not treated."

For more information on how you can help Minnesota's rescue and shelter dogs and cats through the VMC's Shelter and Rescue Animal Fund, please contact Andrea Fahrenkrug at afahren@umn.edu or 612-626-6501.

Nicholas, 9, and Laney, a 5-month-old former foster dog recently adopted by the family.

"Yvonne has unbelievable energy all day," Johnson marvels. "It's so much fun to watch her and Laney play. They both get into a play bow and stare each other down until one of them takes off. Then the chase is on."

Firecracker

When a Good Samaritan brought a 6-month-old black kitten to the Paws and Claws Humane Society in Rochester, Minnesota, on the Fourth of July in 2013, shelter volunteers named the frisky feline Firecracker in honor of the holiday. But the sweet-tempered kitten had a problem: For some reason, she was unable to extend her hind legs to walk or jump like a normal cat. She was barely able to rise from a crouch and struggled to walk.

The kitten was examined by a local veterinarian, who suspected that Firecracker had patella (kneecap) luxations in both legs, a congenital disorder in which the kneecaps are dislocated and don't glide within their natural groove in the femur, or thigh bone. Surgery could be done to fix the problem, but it could cost thousands of dollars.

Like most animal shelters, Paws and Claws was already stretching its funds to feed and house the hundreds of stray and abandoned animals it cared for each year. Specialty care such as orthopedic surgery to fix one cat simply wasn't in the budget.

But Paws and Claws volunteers had come to love the sweet, affectionate kitty that hobbled to them on twisted legs and searched their faces with crossed eyes. Knowing she would make a wonderful pet, they found a fund they hoped could help: the Shelter and Rescue Animal Fund at the University of Minnesota Veterinary Medical Center (VMC).

Their application was accepted, and on July 17, 2013, the kitten's foster mom brought her to the VMC for an exam. Firecracker

was admitted by Sarah Hayes, animal care technician specialist, and examined by surgery resident Dr. Erin Corbin. Among Corbin's physical exam findings: the patient "was purring during the whole exam, so it was difficult to hear her heart and lungs." But Corbin did not hear any murmurs, arrhythmias, or abnormal lung sounds. Radiographs soon confirmed the cause of the kitten's mobility problems: grade-4 (the most severe) patellar luxations in both knees. But aside from her luxating patellas and crossed eyes—which did not affect her vision—Firecracker was healthy.

With funds from the Shelter and Rescue Animal Fund, Firecracker underwent orthopedic surgery. Corbin conducted a specialized procedure to align the kitten's quadriceps mechanisms so her patellas would sit in their normal grooves and allow her to flex and extend her legs normally. The surgery entailed making a cut in the kitten's femurs (the bone above the knee) to deepen the groove the kneecap rode in and another cut in each tibia (the bone below the knee). The bones were then lined up and secured in place with pins. The surgery was successful, and the kitten recovered quickly.

Corbin wanted Firecracker to be placed in a foster home where the cat could receive physical therapy, and the ideal candidate quickly emerged: Sarah Hayes, the veterinary technician who had first admitted Firecracker and cared for her before, during, and after her surgery.

Hayes fostered Firecracker for about a month, painstakingly providing physical therapy and monitoring her incisions—all the while full of wonder and admiration for the little cat's remarkable resilience and spunk. Thanks to her colleagues' advanced training and expertise, the brave little kitten now had a second chance at life—and the kitten was grabbing for it with everything she had!

Then Hayes had a thought: Why couldn't she adopt Firecracker? It was unusual for VMC employees to adopt Shelter and Rescue Animal Fund cases, but she had so bonded with Firecracker that she wanted to give her a permanent home.

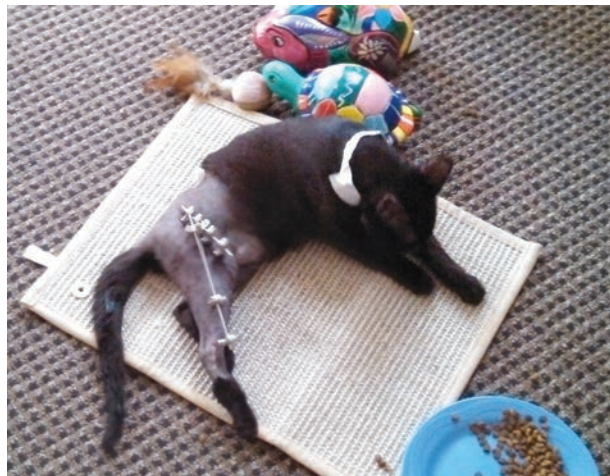
Hayes submitted an official application to Paws and Claws, which was quickly accepted. The purring, cross-eyed little black cat now has a forever home with Hayes in her St. Paul apartment. Firecracker also occasionally stays with Hayes's parents in Fridley, where her dad is especially fond of the fearless little feline.

Now nearly 3 years old, Firecracker is a petite cat with a coat like black velvet, except for a few threads of white that grew in along her incision lines and on her tummy. She's clearly getting a bang out of life, not only running and jumping like a normal feline, but swatting the occasional overfamiliar dog. She likes to hang out under the heat lamp with Hayes's pet turtle and is a notorious toe-biter.

"She's my best bud," Hayes says with a smile. "Nothing keeps her down." ○

"[She] was purring during the whole exam, so it was difficult to hear her heart and lungs."

—DR. ERIN CORBIN



(TOP) Firecracker recovering at Sarah's house after surgery.
(BOTTOM) Sarah Hayes adopted Firecracker after caring for her before, during, and after surgery.

VETERINARY MEDICAL CENTER adds services, plans expansion



Photo by Sue Kirchoff

Senior veterinary technician Jessica McElmury holds a patient as he is bandaged by Dr. Heather Fairbairn.

“It is important that we provide pet owners with convenient hours that better fit their busy lives and that our students recognize that the veterinary profession is no longer a nine-to-five occupation.”

—DR. DAVID LEE

In its quest to provide the complete spectrum of high-quality care, the Veterinary Medical Center (VMC) is now offering urgent care for companion animals.

According to Dr. David Lee, hospital director, the new urgent care service gives owners the option of seeing a veterinarian outside of normal practice hours for issues that could benefit from timely attention but are not sufficiently serious to require a visit to the ER.

“Urgent care helps span the gap between primary care and emergency care,” says Lee. “Our doctors and staff in ER and urgent care work together to ensure that patients are seen by the team best suited to the patient’s needs. For cases requiring specialty care, we have that option here as well—all under one roof.”

While urgent care will not involve students during the first few months, students will be integrated into the service in the future.

“Urgent care is designed to handle outpatient cases on a walk-in basis, which is a very different model than other VMC services,” Lee says. “It is important that we provide pet owners with convenient hours that better fit their busy lives and that our students recognize that the veterinary profession is no longer a nine-to-five occupation.”

Typical patients for urgent care include those experiencing vomiting, coughing, or sneezing; swelling, redness, or discharge in the eyes; discharge or itchiness of the ears; diarrhea or constipation; evidence of a wound or bite; or a change in appetite or behavior.

Lee says the response from the community has been terrific in the first several weeks of the service.

“It’s clear the convenience factor is important to our clients,” he says. “We’re also able to alleviate the worry associated with ‘I wonder if this can wait until Monday.’”

VMC to get a facelift

The VMC will look a bit different in late summer 2016, when its new Primary and Urgent Care Center will open with greatly improved facilities to support service to patients as well as students.

The renovation supports American Veterinary Medical Association recommendations that veterinary colleges better prepare veterinary students for future careers in primary care and companion animal practice—specifically,



Artist's rendering of the VMC's new Primary and Urgent Care Center, which is expected to open in late summer 2016.

Now offering **URGENT CARE**

Urgent care hours are 3-10 p.m. Monday through Friday and 10 a.m. to 2 p.m. Saturday and Sunday.

with an increased focus on preventive care.

The University of Minnesota College of Veterinary Medicine (CVM) was one of the first veterinary colleges to revise its curriculum to meet this growing need, leveraging already well-established strengths in preventive care, public health, and epidemiology.

“Minnesota has long been a leader in preventive medicine for production animals, where preventing disease can have huge economic benefits,” says CVM Dean Trevor Ames. “The profession is now looking at how those principles can be applied to companion animals in an effort to


improve longevity and quality of life. The University of Minnesota is well-positioned to be a national leader in this exciting evolution.”

Construction at the VMC is expected to begin in February and include seven new examination rooms, a central treatment room, and an expanded rounds room able to accommodate two rotations of students at the same time.

“The facility will be consistent with what students can expect to find in a modern veterinary practice after graduation,” Lee says.

Caseload will be consistent with a two- to three-doctor practice, and the modest growth needed for

the second student rotation will be internally driven through the college and university community. The result will be DVM graduates optimally prepared to meet the needs of a rapidly evolving market—something that will benefit the veterinary practices that hire Minnesota graduates.

Additional space will be created by expanding the north and east sides of the VMC a few yards, yielding space to make improvements in the client waiting room (including a separate feline-friendly area), front desk, vending area, comfort room, and social work office. The VMC will have a new covered front entrance on the north side, facing the parking lot, providing more convenient access for clients. Thanks to a recent generous estate gift to the VMC, current exam rooms will be renovated to be consistent with the new primary and urgent care exam rooms. 

ADVANCING

How graduate students make a difference

BY FRAN HOWARD

At any one time, the College of Veterinary Medicine is preparing nearly 60 graduate students to become tomorrow's scientists. And, while that is happening, these students are playing a vital role in contributing to the college's research efforts. There's no doubt that the college benefits from the expertise and knowledge graduate students bring. This next generation of researchers could one day discover breakthrough cures or treatments for human and animal diseases, predict disease outbreaks that affect people, animals, and wildlife, and develop new ways to prevent disease across species.

"One of the college's missions is research, and the bulk of our research is carried out by our graduate students, who are learning scientific techniques and methods and scientific approaches to advance medicine, both veterinary and human," says Dr. Mark Rutherford, associate dean for graduate studies. "We are of one of the very few veterinary schools in the country that shares a campus with a medical school and a school of public health, so our students are involved in a broad range of research. They also have an opportunity to work on almost any research topic they want due to the sheer size of the University."

The college offers two distinct tracks for graduate students. Those interested in research related to animal and human health and welfare can obtain a master's or PhD in veterinary medicine. Study areas for these students include infectious and zoonotic diseases, the development of novel treatments for cancer and other diseases, genetic research and therapies,

virology and bacteriology, and ecosystem and wildlife health. Students interested in careers in the biomedical sciences can obtain a doctorate in comparative and molecular biosciences. These students engage in research at the intersection of animal and human health, including infectious and zoonotic diseases, genetics and genomics, molecular mechanisms of health and disease, and microbial pathogenesis.

"Without research, health and medicine does not advance based on scientific findings," says Rutherford. "It is important that these students learn to be scientists because they are the next generation that will address the new problems that arise."

The work of the following five individuals represents the type of projects CVM graduate students are engaged in and demonstrates how research being conducted throughout the graduate programs could affect future decisions or areas of study in human and veterinary medicine and ecosystem health.

RESEARCH:

DEREK KORPELA: finding treatments for humans and animals

CVM graduate Dr. Derek Korpela knew he wanted to explore research that could one day help humans as well as their animals after participating in a Summer Scholars program as a veterinary student. Today he is discovering new information about how certain cancers that affect both dogs and humans grow.

“I have always had an interest in oncology,” says Korpela, who worked as a small animal veterinarian for three years prior to enrolling in the PhD program in comparative and molecular biosciences. “My family has a history of cancer, and cancer is so prevalent. Oncology research that helps animals also helps people; the biology is so similar. There is not a distinct line, whether you are helping save someone’s child or their animal.”

For the past two years, Korpela has been looking at the role of beta adrenergic signaling—flight or fight—response in the growth of hemangiosarcomas in dogs and angiosarcomas in humans.

“In particular, I am interested in the metabolic drivers of cellular replication and the influences of the tumor microenvironment on tumor cell mitochondrial function,” says Korpela. “Previous studies have hinted that the beta adrenergic pathway may be a driver of metabolic reprogramming in cancer cells, possibly resulting in a poorer prognosis.”

Under the guidance of Dr. Erin B. Dickerson, assistant professor, Korpela carries out his research at the University’s Masonic Cancer Center, where he works with cancer cells from both hemangiosarcomas and angiosarcomas.

“Angiosarcomas are very rare, accounting for only about 1-2 percent of all human sarcomas, but they are deadly,” says Korpela. “Hemangiosarcomas are prevalent in the canine population and thus provide a great comparative model of study.”

Previous research looked at whether a beta-blocker called propranolol, which is used to treat benign infantile hemangiosarcomas, could be used to treat angiosarcomas. The results were promising.

“That led us to wonder how propranolol and other similar drugs affect the growth of these cancers,” says Korpela. “We realized there was a gap in knowledge at the metabolic level.”

Korpela hopes to at least partially fill that gap. The hypothesis he is testing is whether inhibition, by beta-blockers, of the beta adrenergic pathway will interrupt the metabolic pathway responsible for the formation of tumors.

“This work could lead to complementary treatments that could potentially make these cancer cells more susceptible to standard care—chemotherapy,



Photo by Sue Kirchoff

Dr. Derek Korpela hopes his cancer research will eventually help dogs like Rex, an oncology patient at the University of Minnesota Veterinary Medical Center.

radiation, and surgery,” he explains. “If we can render the cancer cells more susceptible to standard treatment, it would be beneficial to both humans and dogs. We think we will find some interesting things out about these cancers that are relatively unknown at this point.”

XI "CASSIE" GUO: understanding the changing ecology of bird flu

From Lanzhou, China, Xi "Cassie" Guo has had firsthand experience with influenza A virus (IAV) in Asia, where this group of viruses is thought to have originated. Today, as a fourth-year PhD student in comparative and molecular biosciences, Guo is helping to determine why spring outbreaks of IAV are becoming more common in Minnesota turkeys.

"Avian influenza is a socioeconomic problem in China; it is not just a problem with agriculture," says Guo, who received her bachelor's degree in veterinary medicine from China Agricultural University in Beijing. "Live bird markets in China gave rise to the emergence of highly pathogenic avian influenza."

Guo's interest in studying influenza viruses led her to the CVM, where her adviser, Dr. Carol Cardona, Pomeroy Chair in Avian Health, has been researching the spread of these emerging viruses in Midwest poultry operations for years.

The first spring introduction of IAV in Minnesota occurred in 1982. For the next 25 years, all cases of IAV in turkeys were introduced in the fall, notes Guo. In all but two years since 2007, however, spring introductions of IAV have occurred. This change in seasonality led to Guo's research project, which is exploring the changing ecology of IAV in turkeys.

Specifically, Guo is investigating three factors that potentially could play a role in spring introductions of IAV in turkeys. First, she is analyzing data to discover whether climate change drives spring introductions. Second, she is deciphering responses obtained from a 2014 survey of Minnesota turkey farms that experienced spring introductions of low-pathogenic avian influenza to determine whether human activities and biosecurity practices have influenced the growing number of spring introductions. And third, Guo is testing droppings from wild birds that were collected in the spring and summer of 2015 to see if they are positive for IAV.



Photo by Sue Kirchoff

Dr. Xi (Cassie) Guo works in her lab in the Veterinary Science building. Advised by Dr. Carol Cardona, Pomeroy Chair in Avian Health, Guo is researching avian influenza.

"Historically, wild birds have been sampled only during the fall season in Minnesota," Guo notes. "My work is providing an entirely new dataset."

So far, Guo says her research indicates that climate could be a contributing factor in the changing ecology of IAV because it can help to maintain the persistence of these viruses and influence the movement of wild waterfowl. She also notes that on-farm ponds and temporary ponding appear to be a risk factor for introductions.

"My research is providing new understanding of how introductions occur, and it is improving our understanding of biosecurity practices used by the turkey industry," says Guo. "It also is increasing our understanding of the role wild birds play in the spring—what viruses they carry and how they move."

IRENE BUENO PADILLA: river health and its impact on humans and wildlife

After learning epidemiological approaches to characterizing risks to humans and wildlife from discharges being made into a model river system, Dr. Irene Bueno Padilla plans to return to Europe. Once home, she hopes to apply the deep knowledge she acquired in ecosystem health and epidemiology during her studies at the CVM to help solve wildlife conservation problems in her native Spain, throughout Europe, and elsewhere around the world.

For the past seven years, Padilla has worked at the intersection where ecosystem health affects the health of wildlife and humans. After

Dr. Irene Bueno Padilla looks for cormorant nests for potential sample locations in a protected wetland near Valdivia, Chile.

Photo by Pedro Rodrigues



receiving her DVM from Spain's University of Cordoba, she completed an internship and a residency at The Raptor Center, where she focused primarily on the clinical care of raptors affected by environmental hazards. She also completed a master of public health while working on her residency.

Today, Padilla is pursuing a doctorate in ecosystem health and epidemiology under the guidance of Drs. Randall Singer and Dominic Travis.

"We are trying to assess the different microbial risks to human and wildlife health, especially waterfowl, caused by discharge from aquaculture farms and wastewater treatment plants into the river that runs through the city of Valdivia, in southern Chile," she says.

The project involves a number of stakeholders in Chile, including the Chilean government, the University of Valdivia, and the freshwater trout aquaculture industry. Historical data collected by the trout industry is allowing Padilla to build a computer model to predict the risk

created by viral and bacterial pathogens found in the river, including those that have developed antibiotic resistance.

"I am hoping to collect more data," she says. "At this point, we still don't understand how some of the pathogens found in the river affect humans or wildlife." The University of Valdivia is also helping to collect bird droppings to determine how the river's pathogens are affecting wildlife in the watershed.

The main purpose of Padilla's study, however, is not to improve management of the Chilean trout industry or to clean up the Valdivia watershed, but to develop a method that can be used to conduct risk analysis in riparian watersheds.

After determining a baseline for the river's normal pathogens and understanding how the mix of pathogens has changed over time, Padilla will develop a risk-assessment framework that she hopes can be extended to river systems throughout the world.



Photo by Sue Kirchoff

Dr. Mike Rahe runs an enzyme-linked immunosorbent assay (ELISA) to test for secreted antibodies from an experiment investigating the stimulation of porcine B cells.

MIKE RAHE: changing the way veterinary vaccines are evaluated

Dr. Mike Rahe likes to ask questions. He also likes to answer them. This innate curiosity could one day lead to a new method of evaluating the efficacy of veterinary vaccines.

A graduate of Iowa State University College of Veterinary Medicine, Rahe grew up on an Iowa hog farm and often accompanied his father, who is also a veterinarian, on ambulatory calls.

"That is the reason I became a vet. I enjoyed riding with my dad, but when I was in vet school, I was drawn to immunology. I didn't expect to be, but I was," says Rahe, who plans to pursue a career in research.

"I really enjoy research. I enjoy the process, and the opportunity it affords to arrive at answers," he says. "It allows me to see a problem through from start to finish. In research, it's all in your own hands. You are discovering new knowledge."

Rahe is currently working on his doctorate in veterinary immunology. Under the direction of Dr. Mike Murtaugh, Rahe is focusing on porcine reproductive and respiratory syndrome virus (PRRSV) in swine, trying to characterize memory B cells.

Once an animal is infected with PRRSV or another virus, its B cells go to work producing antibodies. After an infection, a specific type of B cell, called a memory B cell, develops and acts as a sentinel against reinfection. After fighting an infection, the memory B cell lives on, in case the host is reinfected by the same pathogen. Without these memory cells, an animal is unable to rapidly produce pathogen-specific antibodies.

"Memory cells are constantly looking for the same pathogen to make more antibodies to fight it," explains

Rahe. “The antibodies are the bullets, and the memory B cells are the gun.”

Over the last two-plus years, Rahe has developed methods that combine a culture system with antigen-specific cells to characterize the memory B cells that fight PRRSV.

“We have made encouraging strides,” he says. “If we can characterize these cells, we can study them and

determine which vaccines are effective at producing an effective memory response.”

Currently, veterinary vaccines are evaluated solely on antibody production, but Rahe’s work could lead to vaccine development that is based on memory B cells. This breakthrough could mean that the CVM would one day be able to provide veterinarians with better predictions of vaccine efficacy.

WHITNEY KNAUER: diagnosing sick calves early

Automatic calf feeders have been available in the United States for nearly a decade, but adoption has been slow due partly to the setup costs involved, which run close to \$25,000. Through new research, Dr. Whitney Knauer hopes to demonstrate whether this precision technology can help producers detect sick animals earlier, thus making the investment more economically sustainable.

“I originally wanted to be an equine vet,” says Knauer, who grew up in New Holland, Pennsylvania, and received her VMD from the University of Pennsylvania School of Veterinary Medicine. However, her undergraduate work at the University of Vermont sparked her interest in the dairy industry, particularly calves.

When Knauer was researching graduate schools, her sights were ultimately set on the University of Minnesota College of Veterinary Medicine, where one of the nation’s brightest dairy calf researchers, Dr. Sandra Godden, is working. As a third-year PhD candidate in veterinary medicine, Knauer hopes to expand the knowledge of normal calf behavior and improve current surveillance techniques used to improve health, performance, and the well-being of group-housed, pre-weaned dairy calves. Currently, she is evaluating automatic calf feeders used on a handful of Minnesota dairy farms.

“The beauty of this system is that it automatically captures feeding behavior data for individual animals,” she says. “There is evidence that a calf’s behavior changes when she gets sick, but current detection techniques have been shown to be no more sensitive than a human observer. Our goal is to use a different approach to see if we can find a sick calf earlier.”

The project, being carried out in collaboration with Virginia Tech, involves data collected between February and October 2014 from 1,052 calves spread across four Minnesota and six Virginia dairies.

“Using each calf as her own control, we’re looking at automatically captured feeding behaviors over time to see how a change in behavior relates to when the calves are first observed to be sick,” she says. Ultimately, Knauer hopes to create an index that will alert dairy producers using these systems when a calf is showing early signs of illness, such as a decline in drinking speed or in daily milk consumption.



Photo by Sue Kirchoff

Dr. Whitney Knauer visits with a dairy calf at the University of Minnesota’s Dairy Cattle Teaching and Research Center in St. Paul. Knauer’s research focuses on the health, well-being, and behavior of group-housed, pre-weaned dairy calves.

“We know that if we intervene earlier, we have a better outcome,” adds Knauer. She ultimately hopes to help producers who use these systems raise a healthier pre-weaned animal, not only for the welfare of the dairy calf but for the sustainability of the dairy operation. ◉

FACULTY & STAFF news

Dr. Andres Perez has been appointed to the position of Endowed Chair in Global Animal Health and Food Safety. The endowed chair engages individuals and organizations in the integration and dissemination of knowledge that promotes innovative, responsible, and effective solutions to animal health and food safety challenges at local, national, and global levels. As an associate professor with the College of Veterinary Medicine since January 2014, Perez has been involved in MnDRIVE research projects and global challenges in infectious diseases such as foot-and-mouth disease, avian influenza, bovine tuberculosis, and porcine epidemic diarrhea viral disease.



Dr. Ned Patterson has been named to the International Veterinary Epilepsy Task Force. The group was created to streamline the process and create a common language for researching, diagnosing, and treating epilepsy in dogs and cats. It will establish a basis for future studies of the condition. The 26-member collaboration includes veterinary practitioners, neuropathology, and neurology experts from around the world, four of whom are from the United States.

Associate deans and faculty with responsibilities for outcomes assessment came from around North America, the United Kingdom, and Australia for an Association of American Veterinary Medical Colleges (AAVMC) workshop on assessment of clinical competencies

hosted by **Dr. Laura Molgaard**, associate dean for academic and student affairs, in July. Held at the Pomeroy Student-Alumni



Learning Center, the workshop was a platform for learning about clinical assessments, discussing current practices, and sharing lessons learned. As an action item from the workshop, the AAVMC will form a task force, co-chaired by Molgaard, to articulate updated competencies that align with the direction of other health professions, with the eventual goal of developing a tool that can be shared across schools and professions.

Dr. Pat Redig, professor and cofounder of The Raptor Center, received the T.J. Lafeber Avian Practitioner of the Year award at the 2015 Association of Avian Veterinarians Annual Conference and Expo in San Antonio. Criteria for the award included clinical excellence, innovation, promotion of the profession, contributions to the knowledge base, and caring and compassion for their avian patients and clients.



Dr. Mark Suckow joined the University of Minnesota as executive director and attending veterinarian for Research Animal Resources (RAR) in August. He was previously associate



vice president for research compliance and director of the Freimann Life Sciences Center at the University of Notre Dame. In his new position, Suckow provides leadership in the use of animals in research and teaching, directs and manages RAR animal care facilities and staff on the Twin Cities campus, and oversees regulatory issues, compliance, and training as it relates to animals in research.

Dr. Michael Murtaugh, professor in the Veterinary and Biomedical Sciences Department, presented a keynote lecture on porcine reproductive and respiratory syndrome (PRRS) immunology at the European PRRS Research Award Celebration 2015, in Ingelheim Germany, in October. In September, Murtaugh presented the plenary lecture, “Immunology of PRRSV and PRRS control in the USA,” at the inaugural SwineExpo organized by the Chinese Association of Animal Science and Veterinary Medicine in Xiamen, China.

The University of Minnesota’s Global Programs and Strategy Alliance recognized **Dr. Randy Singer**, professor in the Veterinary and Biomedical Sciences Department, with the Award for Global Engagement. The award is given to faculty and staff members in recognition of outstanding contributions to global education and international programs at the University or in their field or discipline.

In memory:

WILLIAM J. HADLOW

Dr. William J. “Bill” Hadlow, who was an instructor in pathology at the college from 1948 to 1951, died June 20 at age 94. After leaving the University, Hadlow spent his career as a veterinary pathologist at Rocky Mountain Laboratories in Hamilton, Montana, where he also studied slow viral infections, particularly scrapie, a brain-wasting disease of sheep and goats. In 2001, he received an honorary doctor of science degree from the University of Minnesota, which he considered the highlight of his professional career.

STUDENT news

Dr. Eva Furrow, assistant professor in the Veterinary Clinical Sciences Department, has received a National Institutes of Health Mentored Research Scientist Development Award for a five-year study of the role of zinc transporters and dietary zinc in calcium oxalate urolithiasis.

Dr. Tiffany Wolf, research associate in the Veterinary Population Medicine Department, recently won the Wildlife Disease Association Student Scholar award. The award recognizes outstanding academic and research accomplishment, productivity, and potential in pursuit of new knowledge in wildlife disease or health. Wolf researches the epidemiology of respiratory disease in wildlife, focusing on nonhuman primates.



Sara Dion, academic coordinator in Academic and Student Affairs, was honored with a 2015 Access Achievement Award from the University of Minnesota's Disability Resource Center. The award recognizes people who go above and beyond the expected in making the University accessible for everyone.

Dr. John Fetrow, professor and board-certified dairy specialist in the Veterinary Population Medicine Department, was awarded an honorary doctorate from the University of Guelph in June.



Dr. Carmen Alonso, PhD candidate with Drs. Montse Torremorell and Peter Davies, won an award for Outstanding Oral Presentation at the 7th International Symposium on Emerging and Re-emerging Pig Diseases in Kyoto, Japan, in June. Alonso presented her work on aerosols and airborne swine viruses.

Jonathan Clayton, DVM/PhD dual-degree student with Dr. Tim Johnson, won an award for Outstanding Oral Presentation at the American Society of Primatologists meeting in Bend, Oregon, in June, presenting his work on primate gut microbial communities. Clayton returned to the DVM program in September.



Luiza Ribeiro Roos, a student working with Dr. Maria Pieters in the veterinary medicine graduate program, has been named the Carlos Pijoan Fellow in Swine Medicine. Luiza is studying the dynamics of swine *Mycoplasma* infections.

Zinpro Corporation awarded its 2015 Zinpro/Schugel Scholarship to **Katie Sielaff**, class of 2016. Zinpro founded the Zinpro/Schugel Scholarship Fund shortly after the retirement of long-time employee, Dr. LaVerne Schugel, class of 1957, who was director of research and nutritional services at Zinpro.

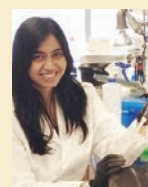
Tan Shaoyuan, a PhD candidate in the veterinary medicine graduate program, was awarded the first Leman China Scholarship. The Leman China Swine Conference was held in Nanjing, China, October 11-13.

Three College of Veterinary Medicine graduate students have been awarded doctoral dissertation fellowships for the 2015-2016 academic year.

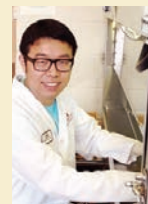
Dr. Carmen Alonso, a PhD student in the veterinary medicine graduate program, is conducting research on the characterization of particle-size ranges associated with airborne viruses in swine aerosols to better understand mechanisms of disease transmission within and between farms. Alonso is advised by Drs. Montserrat Torremorell and Peter Davies.



Dr. Jyotika (Jo) Varshney, a PhD student in the veterinary medicine graduate program, does comparative research on the overexpression of miR-17-92 microRNAs in canine and human osteosarcoma, the most common primary bone malignancy affecting children, adolescents, and young adults. Varshney is advised by Drs. Subbaya Subramanian and David Largaespada.



Dr. Xiong Wang, a PhD student in the comparative and molecular biosciences graduate program, is investigating the evolution of porcine reproductive and respiratory syndrome virus and selection mechanisms at the cellular and animal levels to provide basic insights into the effects of vaccination and intentional infection on the evolution of viral virulence. Wang is advised by Dr. Michael Murtaugh.



Doctoral dissertation fellowships give the University's most accomplished PhD candidates an opportunity to devote full-time effort to a research project by providing support as they finalize and write their dissertation during the fellowship year.



Class of 1965 gathers for reunion

Nineteen members of the Class of 1965 and their guests visited the College of Veterinary Medicine on September 25, when the college hosted a 50-year alumni reunion. Activities included tours, a luncheon, a medal presentation hosted by Dean Trevor Ames, and the September 26 homecoming Gopher football game with the Ohio University Bobcats at TCF Bank Stadium. (The Gophers won, 27-24.)

1960s

Dr. LaRue Johnson, class of 1960, competed in the National Senior Games July 3-16, winning the gold medal in the 200-meter backstroke, two silver medals in the backstroke, and a bronze medal in the individual medley in the 80-84 age group.

1970s

Dr. Kay Lubansky, class of 1977, recently rode her bicycle from California to Florida, covering 3,072 miles in two months and raising more than \$5,000 for her local SPCA.

1980s

Dr. Norma Bailie, MS 1989 (with Dr. Carl Osborne), is a veterinarian at the Cedarmount Veterinary Clinic in Bangor, Northern Ireland.

Dr. Gary Goldstein, class of 1984 (and former CVM faculty member) is now chief medical officer of Best Friends Veterinary Group. He leads medical operations, DVM recruitment, continuing education, vendor partnerships, and quality assurance and improvement for Best Friends' 16 veterinary hospitals and 36 pet care centers across the U.S., with expansion plans in Houston, Indianapolis, Minneapolis/St. Paul, and Seattle.



After serving as dean of Ohio State University College of Veterinary Medicine for six years, **Dr. Lonnie King**, MS 1980, has stepped down. He continues to serve on the National Task Force on Antibiotic Resistance in Production Medicine. Previously, King was dean of Michigan State University College of Veterinary Medicine and director of the National Center for Zoonotic, Vector-Borne, and Enteric Diseases for the Centers for Disease Control and Prevention.

Class notes

1950s

Dr. Ed Larson, class of 1956, was inducted into the Dakota Music Hall of Fame in Aberdeen, South Dakota, on May 28. His classmate, **Dr. Stan Diesch**, nominated him for the award and was the one to introduce him at the ceremony in Aberdeen. Larson plays the accordion and is leader of "The Red Suspenders Band." He continues with his veterinary practice in Watertown, South Dakota. In addition to Diesch, other members of the class of 1956 attending the induction were **Dr. Carl Jessen** from St. Paul, Minnesota; **Dr. Dick Baus** from Redfield, South Dakota; **Dr. Duane Hughes** from Sioux Falls, South Dakota; **Dr. Martin Nold** from Gettesberg, South Dakota; and **Dr. Ruth Krueger** from Texas.



Dr. Peter Poss, class of 1957, has been honored with a University of Minnesota Outstanding Achievement Award. The award is conferred on graduates or former students of the University who have attained unusual distinction in their chosen fields or professions or in public service and who have demonstrated outstanding achievement and leadership on a community, state, national, or international level. With a career spanning military service, rural private practice, the poultry industry, academia, and veterinary consulting, Poss was awarded the Siehl Prize in Agriculture in 2002. He recently became president of the Minnesota Veterinary Historical Museum.



1990s

The University of Minnesota's Global Programs and Strategy Alliance named **Dr. Wantanee Kalpravidh**, PhD 1993, a recipient of the Distinguished Leadership Award for Internationals. Kalpravidh was cited for her impact on the field of veterinary medicine education and on the lives of thousands of poor farmers in Asia. Her initiatives have enhanced disease control in many parts of Asia and contributed to improved livestock productivity. She currently serves as the regional manager at the Emergency Center for Transboundary Animal Disease for Asia and the Pacific for the Food and Agriculture Organization of the United Nations in Bangkok, Thailand.



Dr. Jong-Keuk "Cookie" Lee, PhD 1996 (with Drs. Larry Schook and Mark Rutherford), is now director of the Laboratory of Genome Research at the University of Ulsan College of Medicine in Seoul, Korea, where he studies genetic disease traits. He authored a textbook on genetic variation and diseases, which is now in its third printing and used in many Korean universities.

Dr. Raeyna Longtin, class of 1996, was one of America's Favorite Veterinarians in a contest sponsored by the American Veterinary Medical Foundation. Longtin is veterinarian with True Companions Vet Van in Cottage Grove, Minnesota.



2000s

Dr. Joseph Jude, PhD 2009 (with Dr. Mathur Kannan) is a postdoctoral fellow at the University of Pennsylvania Medical Center, where he is studying airway hyperresponsiveness.

After earning her PhD at Washington State University, **Dr. Abirami Kugadas**, MS 2009 (with Dr. Srinand Sreevatsan) is now a postdoctoral research fellow at Harvard Medical School in Boston.

Dr. Meetu Seth, MS 2008 (with Dr. Srinand Sreevatsan) is a Howard Hughes Medical Institute Fellow at the University of Massachusetts. Seth is nearing completion of her PhD dissertation work under the mentorship of Nobel Prize recipient Dr. Craig Mello.

Dr. Binu Velayudhan, PhD 2006 (with Dr. Kakambi V. Nagaraja), is the head of diagnostic virology for the Texas A&M



Spotlight on **DR. CHRISTOPHER ANDERSON**

Class of 2003

Dr. Christopher Anderson looks back at his days as a DVM student with great fondness.

"The opportunity to collaborate with faculty, clinicians, residents, interns, and fellow students is what I remember most," he says. "It set the stage for the work I do now every day."

As Banfield Pet Hospital's medical director for Minnesota and Iowa, Anderson develops 91 doctors in 21 hospitals—from recruiting veterinarians, to coaching veterinarians, to developing and implementing Banfield's strategies, surgeries, treatments, and medical quality assurance.

As the new president of the College of Veterinary Medicine's Alumni and Friends Society Board, Anderson is looking for ways to increase alumni participation and strengthen the bond between alumni and the college. For him, one of the ways that can happen is to create more opportunities for alumni to engage with current DVM students. Anderson wants the alumni board to be a vital one involved in activities of the college.

"We are looking at signature events such as the White Coat Ceremony, where we can be a part," he says. "The board is also eager to expand reunion events to get DVM classes together more frequently."

The college's mentor program, which pairs a DVM student with a CVM grad, is an area in which Anderson would like to see growth.

"Having a mentor was extremely important to me when I was a student," he says. One of his mentors was Dr. Loren Johnson, a veterinarian from Anderson's hometown of Tyler, Minnesota, a member of the class of 1976. "The commitment is just three meetings a year, and what a difference this can make to a student!"

Anderson encourages other alumni to become involved with the Alumni and Friends Society Board, which will be recruiting members in January.

"For me, it's all about taking my passion for the vet school and the U of M and continuing the great connections I made there," he says.

Veterinary Medical Diagnostic Laboratory in Amarillo, Texas.

Dr. Zhengguo Xiao, PhD 2004 (with Dr. Michael Murtaugh) is an associate professor in the Department of Animal and Avian Sciences at the University of Maryland. Xiao teaches comparative immunology and physiology and continues his research on cytotoxic T cell activation.

2010s

Dr. Maria Jose Clavijo, PhD 2014 (with Drs. Albert Rovira and Bob Morrison), is employed at the Pig Improvement Company, providing technical support on mycoplasma eradication and disease control programs.

Dr. Alex Draper, MS 2013 (with Dr. Stephanie Valberg), is a PhD candidate at the Royal Veterinary College in London, UK. She is mentored by Dr. Richard Piercy and coadvised by PhD alumna and CVM associate professor **Dr. Molly McCue**.

Dr. Eva Furrow, PhD 2014 (with Dr. Ned Patterson) and **Dr. Doug Marthaler**, PhD 2014 (with Dr. Sagar Goyal) received honorable mention awards for 2014 Best PhD thesis at the University of Minnesota. Both are now CVM faculty. Marthaler is an assistant professor specializing in molecular diagnostics; Furrow is an assistant professor of internal medicine and researches genetic mechanisms of diseases in companion animals.

Dr. Heather Lee, class of 2013, and **Dr. Starke Mueller**, class of 2011, have joined VCA Animal Care Hospital in Richfield, Minn.

Dr. Joao Lima, PhD 2013 (with Dr. Scott Wells), has been named executive board member for the National Institute for Agrarian and Veterinary Research in Lisbon, Portugal.

Dr. Daniel Linhares, PhD 2013 (with Dr. Peter Davies) has accepted a position as assistant professor at the Iowa State University College of Veterinary Medicine.

Dr. Nubia Macedo, PhD 2015 (with Drs. Montse Torremorell and Albert Rovira), has accepted a postdoctoral scientist position

in the laboratory of **Dr. Roberto Guedes**, PhD 2004 (with Dr. Connie Gebhart) at the Federal University of Minas Gerais in Brazil.

Dr. Annette McCoy, PhD 2014 (with Drs. Molly McCue and Troy Trumble) has joined the University of Illinois College of Veterinary Medicine as an assistant professor. McCoy received the Stephen J. O'Brien award from the Council of the American Genetic Association, which recognizes the best 2014 student-authored article published in the *Journal of Heredity*.

Dr. Tamene Melkamu, PhD 2010 (with Dr. Scott O'Grady), is a senior research scientist with Recombinetics, a livestock genetics company based in St. Paul, Minnesota.

Dr. Fabio Vannucci, PhD 2013 (with Dr. Connie Gebhart) has returned to the CVM as assistant professor of pathology in the Veterinary Diagnostic Laboratory.

In memory

Melvin ("Mel") Kenneth Abelseth, who earned his PhD in virology from the University of Minnesota, passed away on July 11 at age 91. Abelseth developed the rabies vaccine and was the rabies expert for the World Health Organization for many years.

Alumni and Friends Society Board

Christopher Anderson, president
MaryJo Baarsch
Kevin Barcus
Abby Coodin
Ian Drummond
Rick Goullaud
Theresa Hershey
Judith Lapham
Roy Martin
Mike McMenomy
Susan Miller
Jack Risdahl
Anna Ruelle
Karen Shenoy
Jerry Torrison
Lara Stephens-Brown, student member
Lucy Tongen, student member

SHARE YOUR NEWS

Send your Alumni Class Notes using the online form at www.cvm.umn.edu/alumni/update or e-mail Bill Venne, chief development officer, at venne025@umn.edu.

Or send your news by mail using the form below (attach additional pages of necessary) to:

Alumni Relations, College of Veterinary Medicine, 1365 Gortner Avenue, St. Paul, MN 55108.

Name: _____

Address: _____

City, State, Zip: _____

Phone: _____

E-mail: _____

Graduation year: _____

Employer: _____

Title: _____

Alumni Class Notes news:

Death announcement (name and class year, place and date of death):

Dr. Raymond Diemer, class of 1967, died August 26 in Windom, Minnesota. Diemer worked in a mixed practice for more than 30 years.

Dr. David M. Ennis, class of 1970, died April 21 in Louisville, Colorado. He had a small animal practice, Alpine Glenn Veterinary Clinic, in Thornton, Colorado, for 30 years.

Dr. Edward A. Usenik, class of 1952, of Medford, Oregon, died February 22 at age 88. Usenik was a professor of large animal clinical sciences and veterinary surgery at the University of Minnesota College of Veterinary Medicine for 32 years. While on sabbatical from the college, he taught at San Marcos University in Lima, Peru, and the University of Nairobi in Kenya. Later in his career, Usenik directed the food animal medicine program at Louisiana State University for three years and served as a professor at the University of Zimbabwe in Harare for four years.

Dr. Robert William Woolsey, class of 1961, passed away on September 6.

Generous donors gave \$4.8 million to college in fiscal year 2015

The College of Veterinary Medicine received more than 7,800 gifts totaling \$4.8 million in the fiscal year ending June 30, reports Bill Venne, chief development officer. Though not a record year for the CVM, it was a record year for giving to the University of Minnesota, which totaled more than \$320 million.

Development highlights in 2015 included more than \$420,000 awarded in student support, four new estate commitments worth more than \$1.4 million, and ongoing industry support for avian fellowships and the Minnesota Urolith Center.

Events

Eighteen new bricks were dedicated at the college's annual brick dedication and memorial ceremony in the **Nestle Purina Memories Garden** on July 29. With a gift of \$250 or \$500 (depending on brick size), a brick engraved with the donor's inscription becomes a permanent part of the garden. Proceeds help support the Veterinary Social Services program.

The college thanked major donors at the annual **dean's spring reception** at TCF Bank Stadium on May 13, when nearly 100 members of the Dean's Circle, 1947 Club, and Heritage Society were recognized. After enjoying a social hour and refreshments, the group heard from Dean Trevor Ames about the college's recent accomplishments and bright future. A number of CVM faculty members—including Drs. Meggan Craft, Tim Johnson, Jaime Modiano, Ned Patterson, Katey Pelican, Maria Pieters, and Rob Porter—spoke about their dreams and aspirations.



United Farmers Cooperative donates landscaping for Equine Center Island

United Farmers Cooperative (UFC) of Winthrop, Minnesota, donated all of the landscaping for an Equine Center Island garden installed this past summer. College of Veterinary Medicine Dean Trevor Ames joined Equine Center staff members and representatives of UFC for a dedication of the new garden. In the front row are UFC's Bria Swanson, consumer feeds specialist; Arika Davis, consumer feeds specialist; Sue Kelly, consumer feeds business manager; and Theresa Fleener, consumer feeds specialist. Standing are Greg Peyton, UFC vice president of sales; Sue Loly, large animal hospital supervisor; Sergio Gonzales, animal care professional; Steve Lebrun, vice president of the feed department at UFC; Connie Eshenko, executive operations/student services specialist; Dr. Trevor Ames, dean; and Sheryl Ferguson, large animal hospital manager.



GROW YOUR LEGACY

Whether your passion is the education of veterinary students, groundbreaking research that helps animals, humans, and the environment, or the work of amazing centers such as The Raptor Center or the Veterinary Medical Center, you can nurture your area of interest at the College of Veterinary Medicine.

Planned gifts ensure a bright future for the College of Veterinary Medicine. Opportunities include:

- Bequests in a will or trust
- Naming the College of Veterinary Medicine as a beneficiary of retirement assets or life insurance
- Gifts that provide an income to you or others

For more information, please contact chief development officer Bill Venne at 612-625-8480 or venne025@umn.edu.



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UPCOMING events

AMERICAN ASSOCIATION OF
EQUINE PRACTITIONERS ALUMNI
RECEPTION
December 7, 2015
6-8 p.m.
Mandalay Bay Convention Center,
Breakers Room 1, Las Vegas

NORTH AMERICAN VETERINARY
COMMUNITY ALUMNI RECEPTION
January 17, 2016
6-8 p.m.
Orlando World Center Marriott, Orlando

WESTERN VETERINARY
CONFERENCE ALUMNI
RECEPTION
March 7, 2016
7:30-9:30 p.m.
Mandalay Bay Convention Center,
Lagoon K, L (Level 2), Las Vegas

WHITE COAT CEREMONY
April 23, 2016
1:30 p.m.
St. Paul Student Center

ICOMOS
April 24-27, 2016
The Commons Hotel, Minneapolis,
Minnesota

AQUAPONICS SYMPOSIUM
May 3, 2016
Continuing Education and Conference
Center

BASIC RAPTOR REHABILITATION
WORKSHOP
May 3-6, 2016
The Raptor Center

COMMENCEMENT
May 7, 2016
10 a.m.
Ted Mann Concert Hall

MINNESOTA DAIRY HEALTH
CONFERENCE
May 18-20, 2016
Crowne Plaza, MSP Airport-Mall of
America, Bloomington, Minnesota

ALLEN D. LEMAN SWINE
CONFERENCE
September 17-20, 2016
Saint Paul RiverCentre



A renovated dairy barn, the Pomeroy Student-Alumni Learning Center is home to the College of Veterinary Medicine's Academic and Student Affairs offices.

For the latest news and information about the
College of Veterinary Medicine, visit www.cvm.umn.edu.

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