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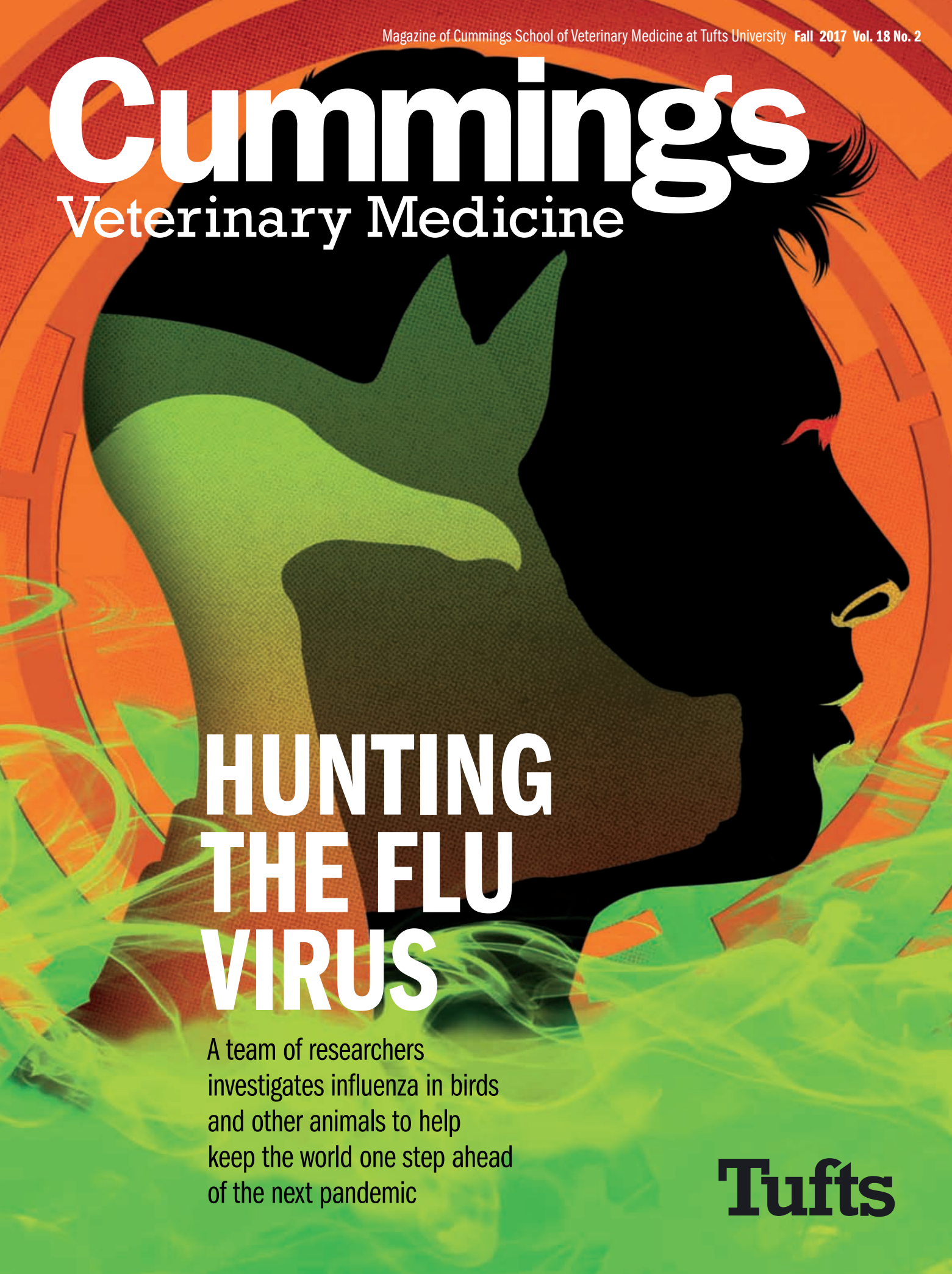
Cummings Veterinary Medicine



HUNTING THE FLU VIRUS

A team of researchers investigates influenza in birds and other animals to help keep the world one step ahead of the next pandemic

Tufts

HUNTING FOR ANSWERS

When 15-year-old Irish sport horse Laddie stumbled during a pre-Thanksgiving drag hunt (using an artificial fox scent) in 2014, his owner, Anne-Seymour Ellis, figured he'd stepped on a stone and sustained a bruise. But when she went to take him for a ride two days later, Laddie's front right leg was swollen. That winter and spring, Ellis led Laddie through snow and sea along Crane's Beach in Ipswich, Massachusetts, but the swelling and pain remained. "Horses usually splash and splash in the water," she said. "He wasn't even doing that."

An array of tests revealed nothing. So that summer, on the advice of her veterinarian, Ellis brought Laddie to Kirstin Bubeck, a veterinarian at Cummings School's Hospital for Large Animals. With the help of an MRI, Bubeck found that the tendon running from the back of the knee to the hoof was inflamed and that the tissues around the navicular bursa had fused together, restricting the tendon's movement. "His injury was fairly intense," said Bubeck, one of three specialists board-certified in sports medicine who see patients at Tufts' new Equine Sports Medicine Complex. "He's a tall horse, too, and that can change things because the forces at work are bigger."

After performing an hourlong surgery to divide the tissues and giving an injection of stem cells to help healing, Bubeck ordered daily, gradually lengthening sessions of walking (with no rider), instructions Ellis followed to the letter. At first, she worried that Laddie might not be improving, but soon the horse was trotting and his checkups showed excellent progress.

Two months after the surgery, Ellis was able to ride Laddie again. "I was teary-eyed. I was so relieved he was OK," she said. Today, Laddie is fully recovered. "I think he loves being out and about, exploring, often just the two of us," Ellis said. –MONICA JIMENEZ

PHOTO: ANNA MILLER

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Cover illustration by Taylor Callery

In Every Issue

FOCUS ON RESEARCH

"HOW IS THE SCHOOL doing in research?" an alumnus asked me at a recent Tufts reception. When he interviewed for admission to the veterinary program in 1982, he added, founding dean Al Jonas made it clear that research was going to be a hallmark of the young school. You'll find ample evidence in this issue that Dr. Jonas's plans came to fruition.

Aligned with the "one medicine" vision of Jean Mayer, the tenth president of Tufts, the veterinary school eventually established research strengths in multiple areas, including infectious and zoonotic diseases, neuroscience, global health, and translational and regenerative medicine.

Since the early 1990s, contributions from our infectious-disease and global-health researchers have advanced the understanding of food- and water-borne diseases such as cryptosporidiosis and schistosomiasis, led to innovations in immunology-based anti-toxin therapies and control of diseases carried by insects, and helped wipe out a plague that killed millions of cattle for millennia (the first animal disease to be eradicated). This issue's cover story explores how a new research group at Cummings School focused on avian influenza brings critical virology expertise to our infectious disease group.

Neuroscience has long been a basic research strength at Cummings School, where scientists use pre-clinical models to study human afflictions such as depression and opioid addiction. Tufts investigators and our graduates are expanding this scope to learn about conditions shared by humans and companion animals, including anxiety and degenerative myelopathy, a disease in dogs that serves as a naturally occurring parallel disease to amyotrophic lateral sclerosis (ALS) in people.

In recent years, translational research in regenerative medicine, cancer, heart disease, nutrition, orthopedics, ophthalmology and other clinical areas has sought to bring new treatments and diagnostics into hospitals to benefit both pets and people. With one of the largest small-animal caseloads in the country and a location next to world-class medical colleagues, Cummings School is committed to enlarging its clinical-trials offerings, which will be supported by new physical space and an experienced director.

Themes that have distinguished the veterinary school since its start also remain embedded in today's research programs. In this issue, you'll read faculty and alumni stories that exemplify our longstanding dedication to animals in society (now expanded to human-animal interaction research), international animal welfare, and active citizenship.

So how is Cummings School doing in research? Our faculty continues to inspire and mentor veterinary and graduate students, interns, residents, practitioners, and alums, all while building top-notch research programs benefiting the health and well-being of animals and people. Dean Jonas and President Mayer would be proud to know that we are thriving—and that quality research is indeed a hallmark of Tufts' veterinary school.

DEBORAH TURNER KOCHEVAR, D.V.M., PH.D.
Dean and Henry and Lois Foster Professor

Cummings
Veterinary Medicine

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PHOTO: KELVIN MA

Kibble

When Anti-Vaxxers Go to the Vet

To counteract misinformation about vaccines, veterinarians share the latest dos and don'ts for your pets. BY GENEVIEVE RAJEWSKI

THE ANTIVACCINATION MOVEMENT threatening human health may be moving into veterinary medicine, with some pet owners refusing recommended shots because of concerns over possible side effects. While it's easy to roll your eyes at the idea of someone worrying about their dog developing autism from a vaccine, veterinarians say that the issue of whether to opt for a particular vaccine is not as black and white for pets as you might think. Here's what you need to know about pet vaccinations.

DO GET THESE VACCINES

The rabies vaccination is mandated by law because it is invariably fatal for both animals and humans. If your pet has a questionable rabies vaccine history and bites someone, it will be quarantined at your expense for a minimum of 10 days, explained Michael Stone, a veterinarian at Cummings School's Henry and Lois Foster Hospital for Small Animals (and your pet could ultimately be euthanized so that its brain tissue can be tested). A dog or cat with a bite wound of unknown origin will typically need to be quarantined for six months, though states have different laws on that.

For dogs, experts generally agree that puppies should get the "distemper" vaccine—a four-in-one shot that protects against distemper, parainfluenza virus, canine adenovirus, and

ILLUSTRATION: HANNA BARCZYK

the highly contagious and potentially deadly parvo virus—and be boostered as adults as needed. The same goes for the feline "distemper" vaccine, which protects against feline distemper and two common respiratory infections.

In terms of timing, veterinary medicine has grown to recognize the importance of vaccinating less frequently, primarily because some cats developed malignant tumors where vaccines had been administered. "After initial vaccination protocols, most vaccines can now go to every three years," said Mary Labato, V83, a Cummings School clinical professor who practices small-animal internal medicine at the Foster Hospital.

DO CONSIDER THESE VACCINES

Outside the rabies and distemper vaccines, "everything else should be based on a pet's particular risk" of contracting a specific disease, said Shari Morana, V93, who founded Community Animal Hospital in Shrewsbury, Massachusetts, and sits on the advisory board for Tufts at Tech Community Veterinary Clinic. "If there's no possible exposure, then don't vaccinate." For example, the feline leukemia vaccine really only makes sense for pets that mingle with other cats outdoors or live with other animals that may carry or be exposed to the virus.

Geography matters, too. While it's not typically a core vaccine, veterinarians in Massachusetts strongly recommended an annual vaccine aimed at preventing leptospirosis, a life-threatening and difficult-to-treat bacterial disease spread in urine from infected wildlife to dogs (and then their owners). "The dog doesn't have to have direct contact with wild animals, just the urine," Morana said. "And there are plenty of infected wildlife in our area, even in backyards."

DON'T MAKE THESE MISTAKES

There's a Lyme disease vaccination for dogs that can be effective, but remember that it's not a magic bullet—some vaccinated dogs still get the disease. Worse yet, the vaccine can offer a false sense of security regarding the need to prevent tick bites, given that it does nothing to protect against the dangerous bacterial diseases ehrlichiosis and Rocky Mountain spotted fever, as well as four other tick-borne illnesses. "Good tick preventatives and daily tick checks protect pets and people best," Morana said.

Another important fact to remember is that half-doses don't count. In February, a Connecticut veterinarian was banned from vaccinating animals for rabies for 25 years because he instructed employees to give pets under 50 pounds half doses of the rabies vaccine. But only full doses of a vaccine should be administered, Stone said, because tests show the shot's effectiveness at that dose.

Finally, some vaccination-cautious pet owners request an antibody titer—a test of the concentration of antibodies against a particular virus in a pet's blood—and then skip a vaccine booster if they think the test results point to immunity. Don't do that. Even if the results suggest a high level of antibodies against the rabies virus, Morana said, they do not qualify as a substitute for legally required vaccination. There's also insufficient evidence of what antibody levels reveal about a pet's ability to actually fight off infection.

Peanut the corgi stars in a new virtual-reality game created by Tufts alumni.

HOW MUCH IS THAT DOGGY IN THE PJS?

Standing in a lush yard under a sunny blue sky, you look down, and there he is: a brown-and-white Welsh corgi with pointy ears and beaming eyes. Crouching, you pat his head and scratch his furry white neck and chest. He rolls over—tongue lolling, paws waving in the air—as you rub his belly.

Ready to take him home? There's just one thing you should know: He's not real.

Meet Peanut, the star of RoVR—a virtual-reality game by Ridgeline Labs, a start-up cofounded by Henry Zhou, E17, and Jeremy Slavitz, E17. Don a virtual-reality headset, and the pup appears in your goggle screens. Using a pair of controllers, you can throw a stick, put on Peanut's leash, or dress him in PJs or a dragon costume.

The game—now deep into development, thanks to some financial help from Tufts and MIT start-up accelerators—is surprisingly satisfying. "Just being in the presence of this thing that you perceive as being alive, that loves you and is happy to see you, has a really positive emotional impact," said Zhou. "I think the reason goes deep into our evolutionary history—as social creatures, we feel this sense of ease when we're with another living thing we can trust, especially a dog." –MONICA JIMENEZ

THE GRIEF COUNSELOR IS IN

AFTER A 25-YEAR career as a clinical social worker in Boston area teaching hospitals, Eric Richman in May joined Cummings School as its first veterinary social worker.

The love people have for an animal often matches the love they have for a human family member, said social worker Eric Richman.

What does a veterinary social worker do?
My job is very similar to the work that social workers perform in human medicine: It revolves around providing compassion and support to families and individuals.

For example, veterinarians are often caring for multiple critical animals with emergencies, but do not want an owner to feel rushed in deciding whether or not to treat an animal. I'll sit down with the pet's family for as long as it takes to help them make sense of all the medical information they've received and to talk through their concerns and feelings. I've also worked with parents on how to help their child face the death of a pet. Sometimes my job is even simpler: Recently, I met a woman who had brought her very sick pet goat to our Hospital for Large Animals. We sat together in the hay, and I just listened while she shared her sadness.

My position also can help support our care teams in the hospitals. Veterinary work can take an emotional toll on both veterinarians and students. I hope they will come by to talk about whatever they're struggling with—whether it's that they had to euthanize five patients in a particular day, or that they're working on becoming a competent doctor in ways that go beyond the hard science, such as learning to deliver bad news in an empathetic manner.

What's different about working with pet owners versus people in human hospitals?
From what I've been seeing in direct practice, the love people have for an animal often is no different than the love they have for a human family member. Yet when they lose that family member, many grieving pet owners are told, for example, "It's just a dog or cat." As a result, many pet owners experience something called "disenfranchised grief," which is pain that's not necessarily acknowledged by society.

People also tend to take on a lot of guilt. They often say, "What did I do wrong?" And the answer is usually, "Nothing." However, pet owners have a profound sense of responsibility, so they feel they let their animal down. These feelings of guilt can be complicated by financial limitations. When a patient comes into a human hospital, doctors typically can pursue a comprehensive workup and treatment plan without asking if the person can pay. In veterinary medicine, however, many people don't have pet insurance and cannot afford to pay out of pocket for that level of care.

What are your plans for the veterinary social work program at Tufts?
Cummings School has run a free pet-loss hotline for more than 20 years, but there's something very powerful about actually being in a room with other people who are going through the same thing you're going through. This fall, I started a support group for people who have lost their companion animal or are anticipating a loss, as well as another support group for Tufts clients whose pets are being treated for cancer.

Given Cummings School's teaching environment, I'd also love to establish an internship program with the five schools in the Boston area that offer a master's-degree program in social work. Both Tufts and the students would benefit immensely from working together to help veterinary social work gain a foothold in the Northeast. **–GENEVIEVE RAJEWSKI**

PHOTO: ALONSO NICHOLS

And the Survey Says...

A Tufts team recently undertook an ambitious project: a biodiversity assessment of all 594 acres of the Grafton campus. The four-month project, sponsored by the Tufts Institute of the Environment, was led by project directors Alison Robbins, V92, AG89, assistant director of Tufts' M.S. in conservation medicine program, and senior GIS specialist Carolyn Talmadge, EG14, and carried out by Irene Galana Lecona and Adel Molnar, 2016 graduates of the M.S. in conservation medicine program, and Matt Kamm, a Ph.D. candidate in biology. Here's some of what they found.

HERPETOFAUNA RESULTS

After creating a detailed map, the researchers hiked target areas using dip nets to sample aquatic habitats. They collected larval amphibians from the nets with teaspoons to avoid harming them.

6

Total number of species observed. Two were reptiles (Eastern garter snake and common snapping turtle), and four amphibians (gray tree frog, Northern green frog, spring peeper tadpole, and two-lined salamander).

The Northern green frog was the most common species identified, with eight sightings.

ALERT!

Since juvenile snapping turtles and eggs have many predators, the survival of adults is essential to the survival of a species in a local environment. The main threats, the researchers explain, include road crossing and habitat loss because of human development.

AVIAN RESULTS

Researchers used satellite images and other info to analyze habitats, then biology Ph.D. student Matt Kamm, professor Michael Reed, and others identified species by sight and by their calls.

60

Total number of bird species identified, including wild turkey, Eastern bluebird, barred owl and white-breasted nuthatch.

Nearly 1,800 Miles

The length of migration of the 1/2-ounce blackpoll warbler, from the forests of Canada to their wintering grounds in South America. The birds use campus as a resting and refueling stop.

ALERT! The bobolink (left), Eastern towhee, and blue-winged warbler have been classified as "species of greatest conservation need" by the 2015 Massachusetts State Wildlife Action Plan.

PHOTOS: TOP, ISTOCK; BOTTOM, TUFTS ENVIRONMENTAL INTERDISCIPLINARY RESEARCH PROJECT 2016

MAMMAL RESULTS

Researchers analyzed maps to find the ideal places to mount camera "traps"—which take photos when animals cross their paths, day or night—and collected 5,631 pictures.

26

Total number of mammal species identified, including Eastern gray squirrels, rabbits, woodchuck, common muskrat, stoat, and fisher.

ALERT!

The report notes that raccoons, as well as skunks (which weren't observed) "represent reservoirs of disease and parasites" that could affect humans and other species.

Coyotes?

Fourteen photos were of "unknown mammal species"—could any of them been coyotes? They were observed on campus during summer surveys in 2016.

White-tailed deer, the most common mammal encountered, were identified 203 times, including with this night photo from a camera trap.

View the full interactive story map—which includes all the data, interactive GIS maps, project results, and team members—at http://arcg.is/2avKPNW.

Preventing Prescription Drug Abuse

PET MEDICATIONS, just like human ones, carry potential risks for accidental poisoning or intentional abuse. "The good news is veterinarians are taking the lead in helping prevent misuse of the medicines they prescribe," said associate professor Elizabeth M. Byrnes, who studies the effects of opioids in her neuroscience lab at Cummings School.

To help ensure that pet medication is used only as prescribed, the Massachusetts Veterinary Medical Association, the teen substance-abuse prevention group Decisions at Every Turn (where Byrnes volunteers), and Cummings School have become partners in a multipronged public-education campaign geared toward pet owners and veterinarians. They shared these guidelines for safe handling of pet prescriptions:

- **Store medication in its original container, always secure the safety cap, and lock it in a safe or lock box away from human meds.**
- **Always check the label every time before using or giving medications.**
- **When giving pets medication, make sure pets finish them before a child is allowed nearby.**
- **To monitor for possible human abuse, make sure that the amount remaining in the container is correct.**
- **Bring unused medications to secure medication drop-off boxes. (To find one in Massachusetts, visit mass.gov/DrugDropbox.) Do not flush medicines down the drain unless specified by the label or accompanying prescription information.**
- **Be aware that certain dangerous drugs, such as fentanyl patches, may require special disposal. If you're not sure, call your veterinarian.**

-GENEVIEVE RAJEWSKI

PHOTOS: TOP, ISTOCK; BOTTOM, TUFTS ENVIRONMENTAL INTERDISCIPLINARY RESEARCH PROJECT
ILLUSTRATION: MARTIN LEÓN BARRETO

Research

Canine-assisted reading is more than a feel-good idea, according to a Tufts study.

THE BENEFITS OF READING TO DOGS

In a study, reading aloud to dogs improved children's attitudes toward school books. BY LAURA FERGUSON

IF YOU SEE A DOG IN THE CHILDREN'S ROOM of your public library, chances are it's not someone's pet—it might well be a therapy dog, and a child might be there reading out loud to it. And with good reason: Dogs, relaxed and nonjudgmental, seem to help even struggling readers find delight in a good book.

For Deborah Linder, V09, SK16, co-director of the Tufts Institute for Human-Animal Interaction, the trend toward "canine-assisted reading" is more than a feel-good idea—it's a rich field for future research. Studies have been done in the area, "but we need much more rigorous inquiry," particularly in educational settings, she said. "If schools want to really tap the potential of partnering with dogs as reading aids, then we need scientific evidence about what works." That would involve research "to be able to optimize programs that help children read." What's also important to the success of these programs is ensuring safety for the animals and the people involved by having proper training and health requirements, she added.

PHOTOS: ALONSO NICHOLS

Linder is already making headway in that direction with a recently published study about a dog-assisted reading project in a Grafton, Massachusetts, public school. It found that when dogs were brought into an after-school program for second graders, the children reported improved attitudes about reading. The research, built on a similar 2010 pilot study in the Grafton public library, aimed to clarify what components of the canine-assisted reading program affected reading skills and attitudes. The study was published in the *Early Childhood Education Journal*.

"We hope to build on this exploratory model to determine the ideal frequency, duration of reading, mechanisms behind any improvement, and how to optimize benefits," Linder said.

In the six-week pilot study, students were divided into two groups. Members of one group read to a therapy dog for 30 minutes once weekly; a control group followed a standard classroom curriculum. Children's reading skills were assessed biweekly, and attitudes about reading were assessed pre- and postintervention. In terms of results, reading-skill scores did not change significantly in either group, nor did attitudes about recreational reading. But when it came to attitudes toward academic reading, scores increased significantly among the children who read aloud to dogs.

Because the study showed an improvement in attitude but not in skills, "we could envision this kind of program as an adjunct to other programs that do improve skills; they could be used symbiotically," said Linder, a research assistant professor at Cummings School of Veterinary Medicine. She grants that it was "unexpected" that reading skills did not improve for either group. One possible explanation is that study participants included children who were already good readers. Other influencing factors could be the frequency of the read-aloud sessions and the relatively short duration of the project. Linder hopes the results will inform future efforts to evaluate reading programs that include dogs: Her vision is to enhance the lives of humans and animals through mutually beneficial interactions.

There is still much to learn, she said. "Would longer programs with more frequent visits have different results?" she said.

Linder had that opportunity this summer. She and Melissa Orkin, AG08, AG13, program director of the Center for Reading and Language Research, were awarded a Tufts Collaborates grant to examine whether reading aloud to dogs could lower anxiety and improve skills in a summer program for remedial readers aged 7 to 11. They're currently analyzing the results of the study, which sought to measure pre- and postprogram anxiety, engagement, and reading skills of struggling readers randomly assigned to read aloud either to a therapy animal or to peers.

Linder sees the Grafton project as a great starting point. "It gives us more things to think about as we go forward," she said. "There is always more to know."

LAURA FERGUSON can be reached at laura.ferguson@tufts.edu.

A child participating in the research study reads to a pal.

COLLABORATING FOR A CURE

Veterinary and human cardiologists at Tufts make the case for studying a heart condition together to accelerate the pace of new treatments.

BY GENEVIEVE RAJEWSKI

SEVEN YEARS AGO, I CAME HOME TO A terrible surprise: My 10-year-old cat Cosmo lying dead in the hallway. Cosmo had just received a clean bill of health from the veterinarian and was completely normal only an hour before. Although I did not pursue a necropsy to confirm, my veterinarian suspected that Cosmo died from hypertrophic cardiomyopathy.

The cardiac disorder, in which heart muscle becomes abnormally thick and dysfunctional, is very common in cats, affecting at least 1 in 10 pets. My experience also was not unusual: The majority of affected animals have no symptoms at all. "Most of the cats we see with outward symptoms of the disease come in through the emergency room," said John Rush, a veterinary cardiologist at the Henry and Lois Foster Hospital for Small Animals. "These cats are normal, normal, normal, normal… until there's a life-threatening issue. The owner will tell us, 'He was fine yesterday.'"

A similar condition afflicts humans. "Hypertrophic cardiomyopathy is present in about 1 in 500 people," said Gordon Huggins, a physician researcher at the Molecular Cardiology Research Institute at Tufts Medical Center. The disease is a common cause of sudden cardiac arrest in young people, including among athletes who die on the playing field. Although an echocardiogram can diagnose hypertrophic cardiomyopathy in both humans and cats—and implantable cardiac defibrillators can help safeguard those human patients most at risk for sudden death—there's no medication or therapy that stops or significantly slows the progression of heart failure. Tufts cardiologists working in both human and veterinary medicine now hope they can change that by encouraging interdisciplinary research—a strategy they outlined in the August 2017 issue of *Cardiology Research*. "As a rule," explained Huggins, one of the authors, "the greater the opportunity to collaborate, the greater opportunity to make meaningful, impactful discoveries."

In both people and cats, hypertrophic cardiomyopathy is often linked to genetic mutations, and nearly all the discovered mutations involve a gene that develops an abnormal protein in the heart muscle. Unlike lab rodents, cats show the same symptoms, disease progression and response to treatment as affected people, making pets a better model to test novel drugs. "Cats really serve as a great model for us to learn about hypertrophic cardiomyopathy," said Martin Maron, a coauthor on the paper and director of the Hypertrophic Cardiomyopathy Center at Tufts Medical Center. "There aren't all that many examples of human heart disease being present in almost exactly the same form in animals." More clinical trials in pet cats being treated for the condition also would be a potential boon for feline medicine, which has no real public funding to study new veterinary therapies for the heart disorder.

One mystery to unravel is why even affected siblings can have such different outcomes—for example, one brother enjoying a long life free of symptoms of hypertrophic cardiomyopathy, the other dying young from heart trouble. Lisa Freeman, J86, V91, N96, a veterinary nutritionist at Cummings School and the lead author of the *Cardiology Research* paper, said this may be because other modifier genes or environmental factors affect the disorder's severity. Several studies by Cummings School veterinarians have demonstrated that, compared with healthy pets, cats with hypertrophic cardiomyopathy have bigger skeletons, larger heads, and higher concentrations of insulin-like hormones related to growth and glucose—and that these animals tend to grow bigger more quickly in early life. Freeman said that these data suggest that diet and growth patterns early in life, even in utero, may play a significant role in how the disease develops.

John Rush conducts an echocardiogram on a cat at Cummings Veterinary Medical Center.

Unraveling these nutrient-gene interactions may provide a key opportunity for improved therapeutic targets and nutritional strategies for managing hypertrophic cardiomyopathy, Freeman said. And, unlike with people, whose diets are hard to restrict for such studies, "we can control cats' diets very carefully." What we learn, she added, may "help not only cats, but ultimately humans."

PHOTO: ANNA MILLER

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How Dogs Think

A scientist explores how genetics and experience shape the canine mind. BY ELIZABETH GEHRMAN

AS A VETERINARY STUDENT at Cummings School, Jessica Perry Hekman, V12, VG12, took an extra year to get her M.S. in comparative biomedical sciences so she could conduct research on cortisol levels and stress behaviors in hospitalized dogs. She found that anxiety levels in these pets separated from their owners were even higher than those of dogs during a thunderstorm. Later, while working toward her Ph.D., she studied the stress response in foxes bred to be tame as compared with those genetically programmed for aggression.

Today, Hekman is a postdoctoral associate at the Karlsson Lab, a joint endeavor of UMass and the Broad Institute of MIT and Harvard that studies dogs, exploring how genetics affect behavior. We spoke to her about dog anxiety, the influence of genetics, and lessons she has learned from her own dogs that she chronicles on her blog "The Dog Zombie" ("I'm fascinated by dog brains—just like zombies like brains").

PHOTO: ALONSO NICHOLS

"If you select for a certain coat color and worry about that first, I can't help but think that's a problem. We should worry about behavior first. Behavioral problems kill a lot of dogs."

Why are you interested in dog anxiety?
I'm anxious myself, and it took me a long time to understand how much that changes my perspective and how I interact with people. So I'm familiar with what stress and anxiety feel like and am sympathetic. The system is very similar in all mammals, so when I learn about it in dogs, I'm learning about it in humans to an extent. When we apply for funding with the NIH, we say that dogs make great models for human behavior, which they do, and much of what we find will apply to humans. If you ask me, though, I'm in it for the dogs.

You write on "The Dog Zombie" that adopting your dog Jenny has informed your understanding of anxiety. How?
Scientifically, it helps me think through how Jenny's brain works and how shy dogs respond to the environment, and what that means in practice. For example, if there's a loud noise, everyone jumps, but Jenny stays frightened for another hour. Does that part of her brain that signals the release of cortisol for the fight-or-flight response stay switched on in some way? Is there a mechanism to turn it off? Is it broken?

You write that genetics and early experience are critical in shaping the adult personality of dogs. Does one seem to have more sway?
Well that's the classic question, isn't it? With some dogs, you don't do a good job socializing them and they're fine; with others, you try really hard to socialize them, and they're a mess. They've shown in humans there are some versions of some genes that lead to increased risk of anxiety and depression in adults if—and only if—there is childhood trauma. There are much smaller effects that may be triggered by much smaller things that are harder to find. That's my passion, finding these little changes in the environment that can lead to differences in "normal" personality.

You chose your dog Dash from a breeder after doing almost as much research as one might for a sperm donor. Is that more reliable than going with your gut?
I wonder sometimes. You can do as much careful research as possible about getting a puppy and then raise them as carefully as possible, and things sometimes still go wrong. Why? By chance some dogs have resilience. Can we find genes that confer resilience, and if we find those genes, how different do those dogs' brains function? We'd all like to know.

Is overbreeding contributing to problems like anxiety?
The famous dog researcher Ray Coppinger, who died in August, said to think of it like a child's mobile: If you pull one end, the rest of it will move. That's what it's like to select dogs for a particular characteristic. If you select for a certain coat color and worry about that first, I can't help but think that's a problem. We should worry about behavior first. Debatably, we should worry about health first, but behavioral problems kill a lot of dogs.

What do people misunderstand most about dog body language?
One is people think a wagging tail is always friendly, and it's not. The other is that people think a dog isn't going to bite them unless it loudly growls and barks first. A really major one for dogs with anxiety is they roll over to show fear, and people think they want a belly rub—that's exactly what they don't want. With shy dogs, it's a really good rule to let the dog touch you first. If the dog wants to be petted, he'll probably bump your hand, initiate contact. If he doesn't want it, he'll look away from you.

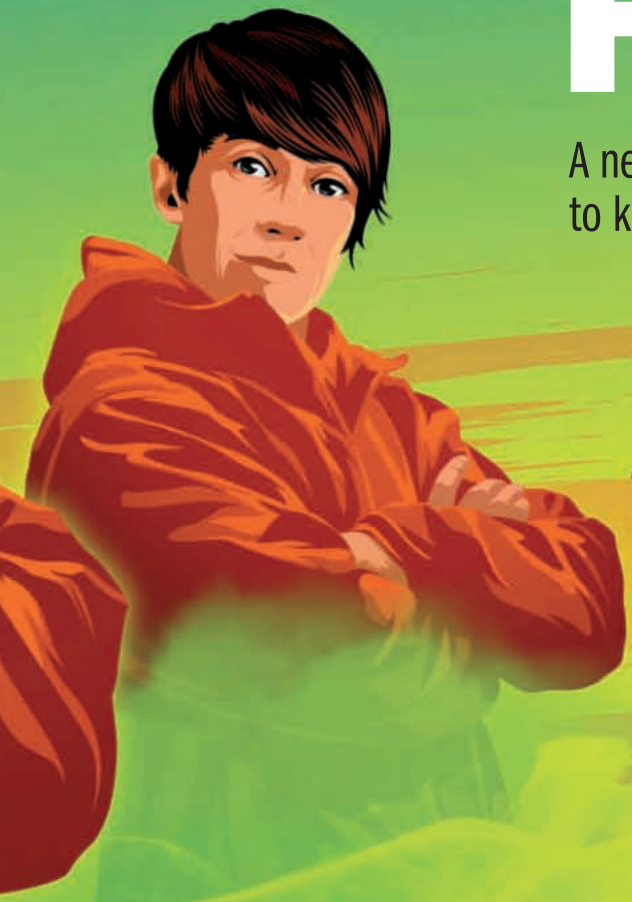
What's the most important consideration in picking out a new dog?
My gut is to say it's energy level. If you can't handle a border collie's energy level, and there's no getting around the fact that you're a couch potato or you don't have a good place to let the dog run, then get a Great Pyrenees. People think size is important, but a really big dog can do great in a small apartment.

Do breed-specific bans ever make sense? Can genetics predict aggression?
No and no. We hope to be able to find variants in genes that would increase the risk of aggression, but it's a very complex trait and environment is a massive factor that you can't totally control. Also there's a lot of bias in reporting breeds of dogs that bite—for example, any sort of blocky-headed dog is called a pitbull—and there's a lot of underreporting of bites by other types of dogs.

ELIZABETH GEHRMAN is a freelance journalist based in Buffalo, New York.

THE FLU HUNTERS

A new research team at Cummings School is racing to keep the world ahead of the next pandemic.



BY GENEVIEVE RAJEWSKI

ILLUSTRATION BY TAYLOR CALLERY

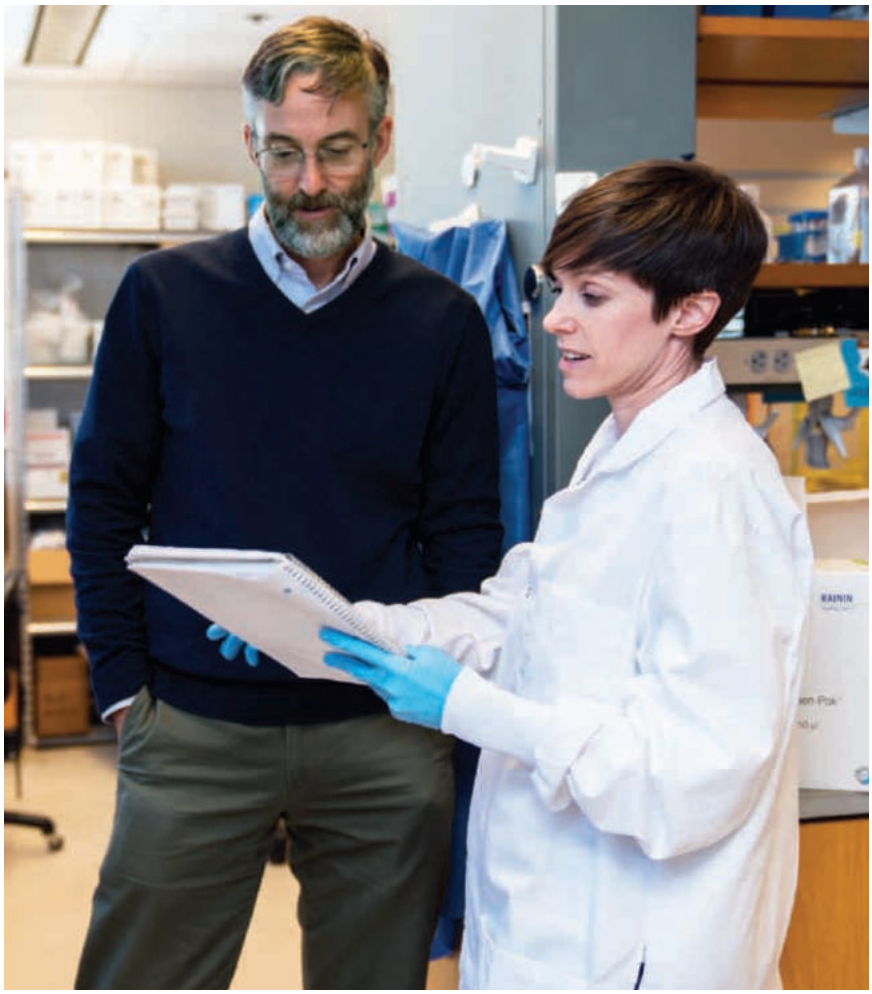
In August 2004, a mysterious disease sickened chickens that a 32-year-old Thai woman was keeping at her home. She buried the last of her flock at the end of the month—wearing plastic bags on her hands for protection—and must have hoped that would be the end of it. It wasn't: About a week later, the woman's 11-year-old niece developed a high fever and severe respiratory symptoms; she died of pneumonia on September 8. Within days, the girl's mother developed the same symptoms. She died on September 20.

By then, the chicken owner herself was gravely ill. And if the initial diagnosis of an upper respiratory infection had stuck, she likely would have died, too. But when she was admitted to a hospital, a team of doctors immediately quarantined her, started her on a course of the powerful antiviral drug Tamiflu—a treatment her relatives hadn't received—and sent nose and throat swabs out for analysis to, among other places, the Centers for Disease Control and Prevention in Atlanta. The results confirmed that the woman had contracted something far worse than a chest cold. She had H5N1, an unusually deadly form of avian influenza.

Over the course of 2004, H5N1 was identified circulating through eight countries in Asia. Millions of chickens died from the disease, and millions more were slaughtered in a desperate attempt to contain it. Although there were only a handful of apparent cases of passing the virus between humans, the virus could sometimes infect people in close contact with affected birds—researchers theorized that's what happened with the Thai girl, who used to play and sleep near her aunt's chickens. And when the virus infected humans, it killed about 60 percent of them. That began "sparking fears that this lethal pathogen might cause a pandemic," wrote the authors of a 2005 *New England Journal of Medicine* study about the Thai family.

One of the people who closely watched the wildfire-like spread of H5N1 was Cummings School professor Jonathan Runstadler, then an assistant biology professor at the University of Alaska Fairbanks. In 2004, Runstadler had just started his lab and wasn't focused on influenza; he was looking more broadly at wildlife disease patterns, examining ducks, geese, sea birds and other species and hoping to determine why certain animals are more susceptible to illness than others. But Runstadler couldn't ignore the H5N1 outbreak, which quickly spread to more than 50 other countries in Asia, Africa and Europe and would eventually kill an estimated 700 people. "It was a huge cause for concern," Runstadler recalled, "because nothing like that had happened with influenza for some time."

The last global flu pandemic had taken place more than three decades earlier, when the "Hong Kong flu" spread from China to other countries in Asia, Europe, and North America, killing one million people over 1968 and 1969. And that was nothing compared with the estimated 50 million people who died from the "Spanish flu" of 1918 and 1919, which killed more



In their lab, professor Jonathan Runstadler and senior research associate Nichola Hill grow flu strains collected from fieldwork and analyze their genomes.

PHOTO: LILLIE PAQUETTE

Thai children wear masks to protect against influenza in Bangkok in 2009.

EVERY SO OFTEN A WHOLLY NEW STRAIN OF INFLUENZA SURFACES THAT KILLS EVEN YOUNG, PREVIOUSLY HEALTHY PEOPLE.

people over two years than the Black Death killed over a century. Since those pandemics, researchers had come to understand that the common link among the flu viruses—indeed, among all 116 types of flu known to infect humans and animals—is that all can be carried by wild birds. Runstadler's fear about H5N1 around 2014, he recalled, was that if it wasn't contained, "migratory birds were going to eventually move it all around the world."

At the time, this was not a concern shared by all in the scientific community. The traditional theory was that avian influenza probably couldn't even survive in hostile environments like Alaska, much less be carried all the way to North America by seemingly healthy birds. This line of thinking was reinforced when H5N1 didn't become a full-blown pandemic—the only human case of it ever detected in the Americas was in a traveler from China. To those experts, viruses like H5N1 really had only two ways of invading: from infected human travelers or from importing infected birds. But Runstadler wondered if migrating birds could, in time, prove a third, hidden travel route for the virus.

From his perch atop North America—at wild birds' migratory crossroads between Southeast Asia and the continental U.S.—Runstadler recognized that he was uniquely positioned to detect the influenza virus if it was going to come through the Arctic. If that new pathway could be proved possible, the knowledge would be essential in helping prepare researchers and doctors for the future. Because even though H5N1 didn't become a pandemic, most experts agreed then, and now, that we will see one again.

MANY OF US THINK of the seasonal flu as a particularly bad cold: You feel miserable for a while, and then you get over it. Often, that is more or less true. Although seasonal human influenza sickens an estimated 25 million Americans every year, most have acquired a degree of immunity to the regularly circulating strains of flu and recover without even needing to visit a hospital. Yet in those with weaker immune systems—the very young, the old, and others—it can turn deadly. Twelve thousand people died during the 2015-16 flu season; if not for the flu vaccine, the CDC estimates the death toll would have been 3,000 lives higher.

But every so often a wholly new strain of influenza surfaces that kills even young, previously healthy people. Such new strains are very rare, but far more dangerous than the seasonal flu, because large numbers of people haven't built up any immunity to them. And unlike the winter arrival of seasonal flu, so far the only thing predictable about a deadly strain is that it will emerge unpredictably. Jonathan Runstadler and his team of researchers are on a mission to help change that.

After the emergence of H5N1 in 2014, Runstadler pivoted his research. Allying with ornithologists and ecologists doing field work, plus a handful of laboratory scientists down in the Lower 48 states, he wanted to see whether they could find avian influenza in Alaska. At the time, there had only been one report of it that far north, from the 1990s. Testing large numbers of samples in a then novel way, with a molecular method referred to as RT-PCR (for "Reverse Transcriptase – Polymerase Chain Reaction"), Runstadler searched for evidence of influenza in the birds and found it. Lots of it.

Now, Runstadler thought to himself, the *interesting part starts.*

PHOTO: PORNCHAI KITTIWONGSAKUL/AFP/GETTY IMAGES

"THE EVOLUTION OF FLU HAPPENS AT AN UNIMAGINABLY RAPID SCALE," SAID CUMMINGS SCHOOL RESEARCHER NICHOLA HILL.

Over two years, he built up a lab equipped to grow flu strains he collected from fieldwork and analyze their genomes. The viruses they had found in Alaska, Runstadler and his fellow investigators showed, were intertwined with the flu's circulation throughout the rest of the world. "There were enormous populations of influenza viruses moving around up north, where they were amplified or originated in birds hatched in a breeding season," he said. "The migration of birds would then rain these new viruses down on the southern latitudes."

The discovery shifted the way scientists viewed the flu lifecycle (Runstandler's paper on RT-PCR detection of influenza, meanwhile, helped establish it as the gold standard for detecting flu viruses). And when the National Institutes of Health in 2007 announced plans to establish a network of influenza centers working to track the flu—an initiative called the National Institutes of Health Centers of Excellence in Influenza Research and Surveillance—Runstadler answered the call.

In fall of 2011, Runstadler moved his lab to the Massachusetts Institute of Technology, where he hired Wendy Puryear and Nichola Hill. They study and sample animals out in the wild, including in Alaska and coastal Massachusetts, and then return to the lab to analyze the samples for influenza viruses. In 2017, Runstadler and his team moved to Cummings School, attracted by the active group of researchers studying wildlife and infectious disease there, as well as by the Tufts New England Regional Biosafety Laboratory, a level-three biosafety facility where the team can test for viruses, which can't be spotted by eye in the birds carrying them. "We can hold a bird in our hands, and it will be completely asymptomatic to our eyes," Runstadler said. All the clinical signs of influenza "don't apply to a wild animal that has coevolved with the virus for so long and figured out a defense strategy to coexist."

While much of the team's research involves how the flu infects and evolves within animal hosts, these insights can help better safeguard human health. One avenue toward this goal is tracking and analyzing the many strains of flu found in nature to help develop an even more effective vaccine. A major challenge to a vaccine is the fact that influenza is constantly evolving. When it infects a host's cells, it reproduces by quickly copying itself thousands of times over in a matter of hours, rather than years or decades—the timescale of human generations. "The evolution of flu happens at an unimaginably rapid scale," said Hill, a senior research associate at Cummings School, "making it an ideal system for studying evolutionary processes, such as natural selection." Even though the speedy replication process is sloppy, with the virus making many mistakes, some of those duplication

A farmer collects eggs at an Illinois poultry farm in 2015, after a devastating outbreak of avian influenza in the midwestern United States caused prices to skyrocket.

PHOTO: DANIEL ACKER/BLOOMBERG VIA GETTY IMAGES

Nichola Hill (top and bottom, left) and the other Cummings School researchers head out into the field every year to collect thousands of samples from water birds and other wild animals.

errors can lead to mutations that are evolutionarily advantageous. The flu strain may change in such a way that it can appear new to a host's immune system, escape its defenses and live on to cause new infections.

To track how flu viruses are changing involves gathering immense volumes of data. The Cummings researchers head out into the field every summer to collect thousands of samples from all manner of ducks, geese and other water birds, as well as other animals. They then feed their data into a genomic database funded by the National Institutes of Health. "NIH would like to know how much diversity there is versus how many of these strains are stable in a population," Hill said. The team hopes that scientists will one day be able to identify parts of the viral particles that remain consistent across all strains to help develop a universal vaccine.

Another avenue of research for the Runstadler Lab is uncovering what environmental and other factors increase the flu's pandemic potential. The flu is unique in that it can jump across species. "It's usually difficult for viruses, and even for some other types of pathogens, to cross species boundaries," Runstadler said. "But influenza seems to have been very successful in infecting lots of different species and lots of different groups of animals."

A pandemic strain of flu can result when this species-hopping ability combines with a genetic-mixing process called "reassortment" (Hill calls it "virus sex"). Reassortment takes place when two viruses coinfect the same host cell, swap segments of their genetic code, and produce a virus that's altogether new. For example, if a deadly avian influenza virus crossbreeds with a strain easily spread among humans, the resulting offspring could be a virus that infects many people, all of whom would have no immune history to fight it off.

This happened in April 2009 when an avian influenza spread from wild birds to poultry, mutated in a pig, and then made the leap into humans. From its emergence in Mexico, the H1N1 "swine flu" spread rapidly around the world and, within three months, the World Health Organization declared it the first pandemic in more than 40 years. It is estimated to have killed more than 240,000 people, most of them children and younger adults.

Since most strains of H1N1 circulate regularly (and relatively harmlessly) through humans, the pandemic caught many by surprise. "It was probably the last on everybody's list of what to expect as the next emerging threat," Runstadler said. His team's goal is to reduce that element of surprise in the future.

EVEN AFTER THE H5N1 BIRD flu that savaged Thailand and other countries in 2004 and 2005 receded, it never stopped evolving. Over time, "the original H5N1 became endemic in some wild bird and poultry populations in Southeast Asia and China," Runstadler said, and H5N1 also produced two new

PHOTOS: TOP, LILLIE PAQUETTE; BOTTOM, JONATHAN RUNSTADLER

lines of offspring. In December 2014, one of those H5N1 descendants—the H5N8 avian flu—crossed from British Columbia into Washington State.

H5N8 tore through Midwestern poultry farms with alarming speed. On March 4, 2015, it was detected in Minnesota, five days later it was in Missouri, and it crossed into Arkansas and Kansas less than a week after that. By mid-April, the H5N8 had infected an Iowa farm that was the nation's third-largest producer of eggs. The cost of stopping the spread, to prevent even worse outcomes, was astronomical: more than 8 million birds needed to be destroyed. "Fifteen years of work," the farm's president told the *New York Times*. "Gone in a week." The newspaper reported that H5N8 caused the loss of more than 15,000 jobs and cost U.S. businesses $2.6 billion in sales.

For all its destruction to the poultry industry and the birds themselves, the virus did not affect people. "Given the information at this time, the risk of human infection [from H5N8] is low, but cannot be excluded," concluded a 2016 WHO update that called for continued surveillance. After all, the "H5N8 strains belong to a group of viruses that, in the right instances, can cause human infections and severe pathology, if not death," Runstadler said.

As the poultry pandemic raged on, Runstadler's team was still studying birds in Alaska and, with additional funding from NIH to expand their work, they worked to understand the origins of the H5N8 virus in North America. After doing a kind of genetics forensic investigation, Hill and her colleagues showed that the H5N8 virus had traveled with migrating birds from Southeast Asia into North America. Their analysis, which mapped the highly pathogenic poultry viruses' evolutionary family tree in *Emerging Infectious Diseases* in April 2017, revealed that reassortment between viruses in wild birds breeding in Alaska had then helped the highly deadly H5N8 virus get a foothold in North America and spread through Canada and the U.S.

Wendy Puryear (right) takes a team to islands off Cape Cod to test seals for flu viruses. They've found influenza in 5 to 15 percent of the gray seals, which is comparable to what they find in wild birds.

Alaska attracts huge numbers of migratory birds from Eurasia and North America that fly north to breed, making it a unique spot for cross-breeding viruses. "We see many viruses that are partly North American and partly Eurasian in their genetic composition," Hill said. The new flu strains that result are then able to spread rapidly outward into North America and Eurasia, aided each year by an eruption of susceptible young birds to infect. Dangerous H5 subtype strains from Southeast Asia could travel across the Bering Strait and through North America via migrating birds, Runstadler's team had shown—the very pathway he had theorized about a decade earlier with the H5N1 outbreak.

This essential new insight requires researchers to broaden the pathways of infection they are tracking. "It's important for biosecurity that we understand that this bird flu was not something that came from a bird imported from Asia or someone traveling here with the virus," Runstadler said. How well we predict the next introduction of a harmful strain of influenza, he continued, will hinge on our understanding of the ways that different animal populations, including humans, coming together in one place can create conditions ripe for the virus to evolve and spread.

PHOTOS: TOP, MARGOT MADDEN PERMIT # NMSF 17670; BOTTOM, MILTON LEVIN

AFTER SEALS DIED FROM THE FLU, RUNSTADLER'S TEAM DECIDED TO CHALLENGE ANOTHER TENET OF CONVENTIONAL WISDOM.

FOR YEARS, RUNSTADLER and his team have demonstrated that the flu living and mutating in populations of migratory birds could be carried to other parts of the world by way of Alaska, something many didn't think was possible. After 162 harbor seals on the New England coast died from the flu in 2011, Runstadler's team decided to challenge another tenet of conventional wisdom.

Seals had periodically been struck by influenza, and it had always just been assumed that they got the flu from wild birds, said Wendy Puryear, senior research associate in Runstadler's lab. "We came into the picture saying, 'Well, nobody's really looked, so how do we know that it's not something that's circulating all the time?'"

To answer that question, Puryear every winter takes a team by boat to Muskeget and Monomoy islands off Cape Cod, the second and third largest seal-pupping colonies in the world. The temperatures are frigid. "We wear these big, crazy survival suits," Puryear said. "You feel like the Sta-Puf man." Working in pairs, Puryear and her colleagues carefully sneak up on a pup, scoop it up in a special bag and carry it out of sight of the rest of the animals. The team takes photographs, measurements, and various kinds of samples to help support as many other marine mammal research projects as possible. Then they release the pup back where they found it. After that, they return to the lab to look for evidence of the flu.

So far, Runstadler's team has found influenza in 5 to 15 percent of the gray seals it has sampled, which is comparable to the 5 to 20 percent it finds in wild birds. The findings are intriguing, said Puryear, because if the seals are contracting influenza from the birds, that may mimic how it has often evolved to pass between species and into humans. In the 2009 pandemic, it was close contact among wild birds, chickens and pigs that led to an avian form of the virus spilling over into swine. That mammalian host provided just the right launching pad for swine flu to jump into humans. "Now," Puryear said, "we've got the influenza virus potentially bouncing back and forth between sea birds and another mammal: seals." The Cummings team is looking for new ways to grow enough of the virus sampled from seals to genetically sequence it and compare it with types found in other mammals.

What seems to be true from other studies Runstadler's team has done is that reassortment events appear critical to flu viruses' ability to move from one species to another. And knowing the hazards of reassortment events can also point to human behavior that is changing the environment in a way that might inadvertently help a future pandemic. For example, during the November to March scallop season on Cape Cod and the islands, fishermen shuck and discard the shellfish waste onto designated piles onshore, not far from seals' pupping grounds. "It's like something out of a Hitchcock movie," Puryear said. "Hundreds of birds can flock down to the scallop pile for a feeding frenzy." The Tufts researchers have found far more influenza around these waste piles than they'd normally expect. "We're artificially congregating these animals, which may allow these transmission spikes to happen, and doing this is in close proximity to where seal pups are being born," Puryear said. Understanding the relationship of human activity to influenza circulation and transmission in animals may prove critical to tracking and preventing future outbreaks.

The Cummings School researchers aren't about to rest until they've figured it out. "The gray seal flu viruses appear to be circulating in a host that's not only undergoing tremendous population growth, but also increasingly mixing with other seal populations," Runstadler said. Meanwhile, humans are coming into closer contact with seals, both through the fishing industry and on beaches. And it's possible that only one interaction between a seal host and a human can transfer a virus that could have dangerous repercussions, Runstadler said. "These are all reasons we need to keep working on this puzzle."

Contact GENEVIEVE RAJEWSKI, the editor of this magazine, at genevieve.rajewski@tufts.edu.

PHOTO: MARGOT MADDEN PERMIT # NMSF 17670

Jim and Jenny Desmond are creating the first sanctuary in Liberia for orphaned chimpanzees—all victims of poachers illegally hunting adult chimpanzees for meat and selling their young offspring as pets.

A Rescue Mission

For years, international organizations have turned to Jim Desmond, VO8, VGO8, and his wife, Jenny, to care for primates in crisis and to track dangerous diseases like Ebola. Now, in the tropical forests of Liberia, they're taking on their toughest challenge yet. BY GENEVIEVE RAJEWSKI

WHEN VETERINARIAN JIM DESMOND, V08, VG08, and his wife, Jenny, first arrived in Liberia in July 2015 to care for a group of chimpanzees, the situation they found brought them to tears. "It was horrible," recalled Jim. "The chimps were desperate. You'd come up with a boat to bring them food, and the chimps would go crazy trying to climb in to grab it. And they were fighting each other, because there just wasn't enough to go around."

For thirty years, chimpanzees kept at the Liberian Institute for Biomedical Research served as research subjects for hepatitis B vaccine studies conducted by the New York Blood Center. In 2006, the blood center halted its experiments, retiring the apes to six nearby islands within an estuarine habitat with extensive mangrove forests. For nearly a decade, former lab staff cared for the animals, which were wholly dependent on humans for food and fresh water. Then, in March 2015, the blood center cut off all funds. The staff—who kept on caring for the chimps, unpaid—knew all the animals were likely to die if they couldn't find anyone to help.

No one knows what would have happened if not for the recent Ebola outbreak in West Africa, which started in Guinea in December 2013 and raged across the neighboring countries of Liberia and Sierra Leone, killing more than 11,000 people. Because the former hepatitis research operation was one of the few laboratories in Liberia—a nation torn apart by a 14-year civil war—researchers from international health agencies used it to conduct Ebola research. The chimpanzees' head caretaker, Joseph Thomas, who had worked with the animals since the 1970s, brought visiting scientists out on his boat to witness the chimps' distress firsthand, and begged them for money to buy both food and the fuel needed to bring it to the animals. One of those scientists alerted the Humane Society of the United States (HSUS).

The HSUS and a coalition of 40 organizations responded by trying to find someone to manage the chimps on-site and soon found that the short list of qualified people was short indeed, said Doug Cress, then the director of the United Nations' Great Ape Survival Project. At the top of that list were Jim and Jenny Desmond: Over fifteen years, they had cared for gorillas, orangutans, chimpanzees, monkeys, and other primates at eight sanctuaries in seven countries around the world. When several organizations came together to create a sanctuary for eastern lowland gorillas in Democratic Republic of the Congo, Cress had recommended the Desmonds because they could whip up community support like no one else, even from such a remote facility: on top of a mountain, miles from the nearest city or airfield, the nearest neighbors often rebel armies. Just as important as that experience, Cress said, was that the couple knew when they'd need to adjust their approach for an entirely new climate.

But as it turned out, the plight of the former lab chimps wasn't the only crisis to contend with in Liberia. During a five-week intervention Jim and Jenny undertook before signing on to the job, something unexpected happened: Locals brought them two infant chimps that had been kept as pets in deplorable conditions. Over time, more and more came in—today, 17 of them have been confiscated by the Forestry Development Authority, the government agency tasked with protecting wildlife and enforcing wildlife laws in Liberia. Most of the animals are only two or three years old, and all are victims of poachers illegally hunting adult chimpanzees for meat and selling their young offspring as pets. The orphaned chimps' history is not just tragic; it's also a troubling indicator of what lies ahead for western chimpanzees, a critically endangered subspecies that saw its numbers in the wild decline by 80 percent between 1990 and 2014.

The Desmonds came to understand that they were ideally situated to help combat the problem. First, they had the vast stores of experience they would need to help build a sanctuary for the chimps from the ground up. Second, they happened to be in one of the best possible places for such a sanctuary to be built. The years of unrest in Liberia has meant that much of the chimpanzees' habitat there has been protected from development. Of the roughly thirty-five thousand western chimpanzees that still live in West Africa, seven thousand are estimated to inhabit this one small country. "It's the only country in West Africa where large tracts of the Upper Guinean forests still remain intact," Jim said.

So today, more than two years after setting foot in the war-torn nation, Jim and Jenny have no plans to leave. Liberia: Come for the desperate chimps abandoned on mangrove islands, stay for the desperate chimps orphaned by poachers—it's not a pitch for a kind of life most people would find irresistible. But the Desmonds aren't most people.

PHOTOS: JENNY DESMOND

Anyone looking in from the outside would assume that Jim and Jenny have always worked in wildlife conservation. But Jim was a well-paid recent chemistry grad employed in pharma in 1994 when he met Jenny, who was leading trainings on large-scale fund-raising around the U.S. Within a year after meeting, the two married.

Their lives changed course on an around-the-world honeymoon. At an orangutan sanctuary in Borneo, Jim met Annelisa Kilbourn, V96, who was working with veterinarian William Karesh and virologist Nathan Wolfe to look for diseases that great apes might pass on to humans and vice versa. (Kilbourn, whose research provided the first evidence that Ebola threatened wild gorillas, died in a 2002 plane crash.) Jim couldn't stop thinking about the encounter. If he could do the kind of work that Kilbourn was doing, he could apply his scientific mind to a cause he felt passionate about. But first he would need to go to veterinary school to build the proper foundation.

Jenny took the bold step of writing the famous primatologist Jane Goodall to ask for advice on how Jim might gain experience with African wildlife to strengthen his applications. "Jane's assistant, the wonderful Mary Lewis, wrote me back with a personal message from Jane," Jenny recalled. Goodall referred the couple to Debby Cox, then the director of the Jane Godall Institute, who took them in as managers of the Uganda Wildlife Education Centre. "From that day forward," Jenny said, "our lives were never the same."

Jim was determined to go to Cummings School, and when he didn't get in on his first try, he turned down an acceptance from another respected veterinary school to reapply. "If you wanted a different kind of career in veterinary medicine, Tufts was the place to go," he said. After he was accepted to Cummings in 2003, he enrolled in a dual-degree program that allows students to earn a D.V.M. alongside a master's in comparative biomedical sciences over five years. A Dr. Henry L. Foster Scholarship helped Jim pursue his new path by lessening some of his debt.

A year after graduating in 2008, Jim landed his dream job with EcoHealth Alliance, which conducts international research into the relationships between wildlife, ecosystems, and human health. For six years, he and Jenny spent months at a time in China, Indonesia, and Myanmar while Jim tested domestic animals for pathogens, conducted avian influenza surveillance, and investigated wildlife markets as sources of animal diseases that could spread to people. The Desmonds also became the Pan African Sanctuary Alliance's go-to unit in times of crisis. "It just seemed there was no task too big for those two," said Cress, who served as executive director for the association of primate rescue centers and sanctuaries across Africa.

In 2015, the HSUS approached the couple, then working in Kenya, about the position in Liberia. "We didn't say yes right away," said Jim, explaining that they were happy in Kenya and had just been offered a job managing a conservation center there. But a five-week intervention turned into a yearlong contract with the HSUS, and then another.

Their work turned the situation around for the former lab chimps. The Desmonds not only made sure the animals got enough food; they corrected the unnatural feeding schedule that was causing so much stress. "The chimps were getting fed only every other day," said Jim. Within a few months of daily feedings, the chimps were relaxed and coexisting peacefully, and now, said Jim, "they've put on weight and their coats have a glossy sheen." Jim also instituted a much-needed—and so far successful—birth control plan. The chimpanzees were having babies, which was "really not a good situation," he said, "because each new chimp will live fifty to sixty years in captivity."

In May 2017, the HSUS came to an agreement with the blood center. The HSUS would assume lifetime care of the lab chimps, supported by $6 million from the blood center. Five months later, the Desmonds' second consulting contract with the HSUS ended and was not renewed. They decided to stay in Liberia anyway. EcoHealth in November 2015 had tapped Jim to lead a new project there aimed at finding the species that keeps the Ebola virus circulating in nature between outbreaks in humans. And they were devoted to helping the orphaned wild chimpanzees.

The decision to stay in Liberia was not one they took lightly. "It would've been a lot more fun to stay in East Africa," Jim said. In their five years living along Lake Victoria and the white sands of Diani Beach, the Desmonds

A Dr. Henry L. Foster Scholarship helped Jim Desmond pursue a new path in wildlife veterinary medicine.

Jane Goodall (left) helped Jim, shown with Jenny and their rescue dog, Princess, gain experience before applying to Tufts.

frequently had friends and family visiting, and savannah safaris in national parks were only a short drive away. "We miss it sometimes," Jim said. "But this is where we were meant to be, I think."

In addition to the couple's work with chimpanzees, Jim has had his hands full with his infectious disease research. The Liberia study seeks to test eighteen thousand bats for Ebola by the end of 2019, which has meant Jim has had to assemble the right research team: ten research technicians, two social scientists, an administrator, and five drivers. "The only non-Liberian who works on the project in Liberia is me," Jim said. Given the brain drain that resulted from the country's civil war, this "has been our biggest success so far." He noted that the team operates independently, and "now the people we've trained can train other Liberians."

Jonathan Epstein, V02, MG02, the associate vice president of conservation medicine at EcoHealth, said, "Jim is very committed to making sure that our local in-country team is both highly trained and also well mentored. He's right there with them in the field and the office, teaching them about every aspect of the project from animal capture to sample storage to data management." That's important, Epstein said, because "ultimately, Liberia will have to be prepared to handle the next zoonotic disease outbreak, whether it's Ebola or something entirely new."

As for the sanctuary project, it's well on its way. Recently, the Desmonds formally registered Liberia Chimpanzee Rescue and Protection as a Liberian NGO—the country's first and only sanctuary for wild chimpanzee victims of the bushmeat and pet trades. The orphaned chimpanzees currently live on the grounds of the National Public Health Institute of Liberia, where the couple cared for the former lab chimps. Jim and Jenny hope to remain there for up to a year while they raise money. Leveraging Jenny's grant-writing experience, they're applying for funding and hoping to establish a trust overseen by board members from local and international animal-welfare and conservation organizations. Their first goal will be to lease a parcel of community land they've identified. "Right now, our sanctuary consists of a bunch of enclosures with outside play areas and full-time caregivers," explained Jim. "But hopefully we will be able to move soon and build the infrastructure so the chimps can play out in the forest."

The effects could be far-reaching. A 2013 International Fund for Animal Welfare report found that the illegal wildlife trade internationally generates an estimated $19 billion per year—globally, it is organized crime's fourth most lucrative activity, behind narcotics, counterfeiting, and human trafficking. Sanctuaries are invaluable in the fight against such activities, because without them, officials don't know what to do with any animals they might confiscate. "Since African governments generally don't have facilities to care for live wildlife, law enforcement officials tend not to arrest animal traffickers," said Gregg Tully, executive director of the Pan African Sanctuary Alliance. "We've found that wildlife law enforcement is typically weaker in countries that don't have sanctuaries. Liberia was one of these countries until Jim and Jenny Desmond began to rescue confiscated chimpanzees."

Jim also believes Liberia's new sanctuary could contribute to public health and safety throughout the world. "There is a live great ape trade, and some of these orphaned chimps could've been shipped off to China or the Middle East," which could spread diseases like Ebola far beyond Liberia's borders, he said. "And it's not like these traffickers only specialize in animals; they also traffic in drugs, guns, and humans. If we can help break up the networks, we are not only protecting wildlife, but also doing a lot to disrupt organized crime groups funding terrorist networks and other activities."

Much work remains to be done, but there are encouraging signs. Liberia passed a wildlife law at the end of 2016, and a group is now writing the regulations that will govern its implementation. And Jenny, who serves on a law-enforcement task force, has written grant applications for money to train the Forestry Development Authority on fighting trafficking activities.

The work is not easy and is often exhausting. Jim and Jenny don't mind, though. "It's exciting to know that what you're doing can have a big impact," Jim said. "We're super busy, but happy."

Contact GENEVIEVE RAJEWSKI, the editor of this magazine, at genevieve.rajewski@tufts.edu.

PHOTOS: LEFT, JENNY DESMOND; RIGHT, ANDREA COLEMAN

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From All C ers

ALUMNI NEWS

BORN TO WIN

RACHAEL GATELY poses Olive Junior, a Dorset sheep, at the Big E, the largest agricultural event on the eastern seaboard. A Tufts Veterinary Field Service veterinarian who has been showing sheep since she was a child, Gately has produced three of the last four national champion ewes. At September's Big E, two of her sheep qualified to move on to the 2017 nationals in Louisville, Kentucky, in November.

PHOTO: ALONSO NICHOLS

The Campus Buzz

A new selective in honeybee medicine is preparing veterinarians to work with beekeepers.

BY GENEVIEVE RAJEWSKI

VETERINARIAN AND ASSISTANT professor Emi Knafo, V08, knows just how tricky and frustrating keeping bees can be. Last year, the hive at her suburban home had thousands of thriving bees—until neighbors sprayed trees with pesticides. "I only knew what had happened because they warned me afterward to keep my dogs off the grass for 12 hours," she said. When Knafo opened her hive, all the bees were dead.

Backyard beekeeping got even more complicated in January when the U.S. Food and Drug Administration put into effect the Veterinary Feed Directive. The regulations mandate that if antibiotics used in human medicine will be ingested by food-producing animals, the drugs will need to be prescribed by a veterinarian. As producers of honey, bees fall under the FDA directive, regardless of whether the insects are kept by a hobbyist or large commercial operation. The new rules seek to address agriculture's role in limiting the rise of antibiotic-resistant bacteria, Knafo explained, as well as reduce antibiotic residues in honey and other foods that could harm unsuspecting consumers with allergies.

Bee keepers have long relied on several antibiotics common in human medicine to treat hives for diseases such as European foulbrood, a bacterial illness. Such bee antibiotics were once sold over the counter, but now these drugs will be available only once a veterinarian has conducted an exam to ensure they're truly needed. "Veterinarians are going to have to go out to visit bees in the yard and actually open hives to inspect them," Knafo said. And that's a sea change that will likely confound both veterinarians and bee keepers, at least in the near future.

"Finding a doctor for your bees is not as simple as finding one for your dog or cat," said Rachael Bonoan, president of the Boston Area Beekeepers Association and a Tufts Ph.D. candidate in biology.

Knafo—who learned beekeeping in high school alongside her mother—is trying to bridge that care and knowledge gap. In Cummings School's new bee medicine selective, first offered last spring, Knafo and guest lecturers taught ten veterinary students about basic honeybee biology, equipment, how to assess a hive's health, and proper care and handling of the bees. (Shortly after the new directive took effect, she led a continuing-education workshop for practicing veterinarians.) A field trip to the Massachusetts Department of Agriculture apiary in Amherst—where the state's honeybee program inspectors conduct education, outreach and research—allowed students to don some protective gear and put what they'd learned into actual practice.

Now, Knafo is expanding the course's hands-on training. She's using a Tufts Innovates grant to install five hives around campus, each with solar-powered wireless data loggers and a live video feed of the bees inside, plus a sixth portable hive with see-through Plexiglas sides for in-person observation. As the program develops, Knafo hopes to offer an introductory selective for first- and second-year students, with an advanced selective offered to third- and fourth-years.

Even without hives, the pilot course proved to be an inspiration, said William David Krucik, V20. "Thanks to the selective, I will be comfortable going out to homes to check out hives and consulting with our state's great apiary inspectors," Krucik said. "My housemates and I even started our own hive."

Bee keepers looking for veterinarians to inspect and treat hives can find more information at beevets.com.

IS DIET LINKED TO DISEASE?

Rachael Bonoan, a Tufts Ph.D. candidate in biology, was unperturbed as she gently removed the top of a bee hive and filled it with smoke from a kettle. She nonchalantly began removing the frames inside to inspect each wax comb for signs of healthy reproduction: bee eggs, just-hatched larvae, and fuzzy young bees that have just chewed their way out of their cells. "It's all about knowing the bees, really," Bonoan said. "I didn't get stung at all last year."

Bonoan, AG18, is studying how populations of honey bees and other bees, responsible for pollinating a third of American crops, have declined at an alarming rate—half of all colonies have been wiped out since the 1950s. Possible causes include chemicals and pesticides, diseases caused by fungi, viruses and bacteria, stress from being trucked all over the country to pollinate crops, and—Bonoan's special area of interest—nutritional deficiencies caused by pollinating large amounts of a single type of crop. To study how diet affects susceptibility to diseases, she is raising bees on different diets at Cummings School to see how they fare when introduced to health threats.

As Bonoan dictated her findings into her digital voice recorder, the hum of buzzing bees escalated and the bees swirled in a dark cloud around her. "I know," she cooed to them. "You're upset." After one fond last look inside, she closed the hive. "If you told my child self that I could have a job playing with bugs, I never would have believed it," she said.

Experience a 360-degree video of honey bees in a hive set up on Tufts' Grafton campus at bit.ly/2ytbru0.

Rachael Bonoan, a Tufts Ph.D. candidate in biology, checks on her bees on the Grafton campus.

PHOTOS: ANNA MILLER

"If your household loses 70 percent of your herd to PPR—that's almost impossible to recover from," said Jeffrey Mariner, V87.

CAN WE ERADICATE GOAT PLAGUE?

A Cummings School researcher is looking to wipe out a viral illness that threatens endangered species—and the livelihoods of families in the developing world. BY GENEVIEVE RAJEWSKI

AN ENDANGERED SUBSPECIES of antelope that roamed the Earth at the same time as woolly mammoths now hovers on the brink of extinction because of an untreatable viral illness called peste des petits ruminants (PPR). The disease—also known as goat plague—has killed more than half of the 10,000 saiga antelopes remaining in Mongolia since late last year.

Since PPR normally affects sheep and goats, international researchers are rushing to vaccinate and restrict the movement of those domestic animals in Mongolia in hopes of containing the highly contagious virus, likely transmitted via infected livestock sharing the antelopes' grazing grounds. If they fail, PPR could threaten a number of other wild species, including the last of the Bactrian camels in southern Mongolia.

PPR has long been the bane of some of the world's poorest people. When Cummings School epidemiologist and professor Jeffrey Mariner, V87, and his collaborators analyzed PPR in 2015, they found that the disease cost sheep and goat herders around the world at least $1.5 billion annually. However, the researchers found that spending an estimated $3.1 billion on eradication efforts could wipe the virus off the planet. Inspired by those findings, the U.N. Food and Agriculture Organization and the World Organization for Animal Health acted swiftly, launching a global program in 2016 to eliminate PPR by 2030.

Now, Mariner—a key player in the international program that eradicated rinderpest, a cattle plague—is undertaking a $2.5 million project, funded by the U.S. Agency for International Development, in which Tufts and University of Florida researchers will test new strategies for PPR control in Uganda and Kenya. Mariner shared five things to know about PPR.

1. IT IS NASTY. "PPR is a Morbillivirus virus, which is related to measles in children and distemper in dogs. Infected animals—be they domestic goats and sheep or their wild cousins—first develop a high fever and, within a couple days, severe diarrhea and sores in their eyes and mouth.

PHOTO: ALONSO NICHOLS

Their eyes glue shut with pus, and their breath smells awful, because the tissues on the surface of their lips and inside their mouths die of necrosis."

2. IT IS DEVASTATING TO ANIMALS. "PPR infection usually ends up killing 70 to 90 percent of the animals in a herd. Baby and young animals usually succumb to the disease because of dehydration and nutrition loss resulting from the severe diarrhea. More mature animals may recover from the diarrhea, but often develop a secondary bacterial pneumonia that can last for weeks and often prove fatal. And the virus can do great harm if it spreads from livestock to an endangered species, given that these populations usually exist in very small ecosystems and may represent the last few thousand animals of their species left in any part of the world."

3. IT CANNOT SPREAD TO HUMANS, BUT IT IS DEVASTATING FOR PEOPLE. "PPR has enormous effects on human economics and food security. The communities where you find affected sheep and goats depend on these animals for milk, meat and income. And in the developing world, sheep and goats are much more marketable than cattle. For poorer farmers, small ruminants are often the gateway to a bigger farm, and women are more likely to use small ruminant farming than cattle as a means to self-sufficiency. Around the world, the overall mortality in livestock from PPR might only be 2 percent, but if your household loses 70 percent of your herd to PPR—that's almost impossible to recover from."

4. IT COULD GO THE WAY OF SMALLPOX. "PPR's closest relative is rinderpest, a cattle disease that was eradicated in 2011—making it the second disease, after smallpox, to be completely wiped off the Earth. And PPR is a good candidate for eradication, thanks to its many similarities to rinderpest. These viruses don't survive well in the environment, and infected animals either succumb to PPR or recover and remain immune for life. That means that the disease always has to find new susceptible hosts. When populations of new hosts are small, the virus will die of its own accord after an outbreak. There are good vaccines that provide lifelong immunity and protection against all strains of PPR and good diagnostics to use in the field. And similar to Tufts' role in helping eradicate rinderpest, we have created new formulations of the existing vaccines that can be used in the field for months at a time without refrigeration."

5. IT REQUIRES VACCINATING SMARTER. "It is much more important to study the disease and then take a surgical approach to attacking it than to vaccinate all the sheep and goats in a country. For example, with rinderpest, we convinced Ethiopia to stop trying to vaccinate all cattle and to instead focus on the few areas that were driving the problem. Once they finally started targeting the right cows, Ethiopia wiped out rinderpest within a year or two—after decades of unsuccessfully trying."

WHY I GIVE

"Despite our dog Freedom's battles, we are winning the war, and we owe the life of our beautiful boy to the staff and students at Cummings School. We feel so very blessed to live close to the most amazing veterinary care on the planet. That is why we continue to support the Cummings Veterinary Fund."

Darryl and Rose Sakach, owners of Freedom and Justice, their beloved Welsh springer spaniels

Freedom's happy ending and the education of compassionate veterinarians are made possible by your annual gift to the Cummings Veterinary Fund. To make a contribution, visit go.tufts.edu/vetmagfall2017.

ON THE FRONT LINES OF ANIMAL HEART CARE

Meet Cummings School's Kristen Antoon, one of only 20 veterinary technicians in the country certified in cardiology. BY LAURA FERGUSON

A YEAR AGO, KRISTEN Antoon, a veterinary technician at Cummings School of Veterinary Medicine's Henry and Lois Foster Hospital for Small Animals, became the 20th certified veterinary technician specialist in cardiology in the United States. She works with clients and their pets to conduct evaluations such as electrocardiograms (ECGs), echocardiograms, and blood pressure and catheter-based tests. Antoon pays "remarkable attention to patient care," said Emily Tompkins Karlin, V08, a cardiology resident. "She is so dedicated to the health and overall well-being of our patients, and consistently goes above and beyond for them."

We spoke with Antoon about her work and how she's inspiring other veterinary technicians to aim high.

CUMMINGS VETERINARY MEDICINE: What's a typical day like as a cardiology technician?

KRISTEN ANTOON: I help ensure that the cardiology service runs smoothly. For example, I make sure that students are getting into the appointments on time, and teach students routine procedures, like drawing blood or obtaining ECGs. For surgeries, I set up the table, prepare the patient for the procedure. During the surgical procedure, I make sure the pet remains stable, which includes close monitoring of the ECG and blood pressure. On a typical day, we may perform anywhere from four to 10 echocardiograms, for our outpatient appointments and/or in-house consultations. Overall, our patient flow varies from day to day; the emergency room could have six cardiac cases come in back to back, and we have to be ready to respond.

How do you make a potentially stressful experience less stressful?

Keeping calm is a good start. We

Veterinary technician Kristen Antoon works to build trust with each pet.

PHOTO: ALONSO NICHOLS

understand that cats and dogs have their own personalities and respond to stressful situations differently. So we learn from our experience with individual patients and make a note in their records regarding their individual preferences. For example, some behave better with their owners close by. Others are calmer if they can hide with a blanket over their head. Still others prefer a minimal amount of restraint, so that they don't feel confined. Getting to know our clients and their animals on a personal level always makes the next visit easier.

What's the most rewarding part of your job—and the most difficult?
I think for everyone working in the veterinary field, the most rewarding thing is seeing our patients go home and knowing that we gave them more time to spend with their families. The most difficult part of my job is the emotional side. Showing constant empathy and compassion goes a long way in helping our clients who may be going through the very difficult time of caring for a sick pet, but I have to be sure my own emotions don't get the better of me.

What's your perspective on the future career path for specialty cardiology technicians?
It's really opened up professional opportunities for me. I spoke at the annual ACVIM [American College of Veterinary Internal Medicine] conference this year with two other specialty cardiology technicians, one from New Jersey and the other from Colorado. We presented on cardiac catheter procedures. I'm also mentoring a veterinary technician at Virginia Tech who is starting her application process, and I'd encourage anyone who's interested to take this extra step of pursuing specialization, whatever specialty they are interested in.

CHARACTER SKETCH

ADVOCATING FOR EDUCATORS

NAME: Nicholas Frank
WHAT HE DOES: Associate dean for academic affairs at Cummings School
HIS WINDING PATH: "As a vet student, I was interested in knowing what I needed to know in order to become a practitioner. Since then, I've experienced advanced training in internal medicine, getting a Ph.D., building a research program, and the joy of many academic pursuits. It is a true illustration of how a veterinary career can unfold over time—you don't know at each step which way it's going to go."
THE BIGGEST CHALLENGE FOR STUDENTS: "Their challenge is to go through the curriculum, get the information they need, acquire the necessary skills, and do it all in a way that's balanced and enjoyable. One area that perhaps overlaps with my interests in teaching and curriculum development is the impact of our teaching on mental health."
THE BIGGEST CHALLENGES FOR FACULTY: Exploring and expanding what they want to do in their teaching and scholarly work while the demands on their time grow every year.
HIS VISION FOR SCHOLARSHIP IN TEACHING AT CUMMINGS SCHOOL: A two-year teacher-training program, with participation rewarded in the promotions process. "In my previous position here, I tried to encourage individuals to explore new teaching methods and to conduct studies that will give us evidence-based approaches to making decisions about teaching. As clinicians, we absolutely practice evidence-based medicine. As educators, we need to practice evidence-based pedagogy." —GRETA SCHEIBEL

PHOTO: PETER GUMASKAS

Demystifying Veterinary Clinical Trials

A veterinary oncologist explains the ins and outs of experimental studies. BY GENEVIEVE RAJEWSKI

WHEN PEOPLE WANT the best care for a serious illness, they often seek out a cutting-edge research and teaching hospital. But what pet owners may not know, is that similar options are available in veterinary medicine. Each year at Cummings Veterinary Medical Center, nearly 500 animals participate in clinical trials, with upwards of 30 studies enrolling patients at any given time.

Yet because clinical trials often test therapies before it is known how well they may work, there are often misconceptions and confusion about the process of enrolling an animal in a study. Here, Cheryl London, V90, a veterinary medical oncologist and director of the new Clinical Trials Office at Cummings School, addresses some common myths about trials and explains how they really work.

MYTH #1: MY PET WILL BE A TEST SUBJECT

As in human health, participation in veterinary clinical trials is always voluntary. If a trial might help, experts explain the potential risks and benefits, any diagnostics or procedures involved, and all the financial considerations. Pet owners then review and sign a consent form detailing the study's goals.

While the study is ongoing, three veterinary technicians (nurses) with more than 50 years of cumulative experience, along with veterinary doctors, monitor each participating pet's health closely. "The safety of our patients is the most important thing to us, and owners are encouraged to ask us lots of questions along the way," said London.

And owners can always remove an animal from a study at any time, she said. "So once you start a trial with your pet, you don't have to finish if

PHOTO: ALONSO NICHOLS

you are unhappy with how treatment is progressing. Also, we will remove an animal from a clinical trial if we believe it is not of any benefit to continue or there are unacceptable side effects."

MYTH #2: CLINICAL TRIALS ARE TOO RISKY

Clinical studies are made available to Cummings School patients only after initial studies have determined that the treatment is safe. "Unlike clinical trials in human medicine, in which a drug or device sometimes may have never been tested in people before, we have a lot of safety data before we try anything in our patients," London said. "So the risk to pets from participating is relatively low."

Many veterinary clinical trials are "open label"—meaning pet owners know the exact drug on trial—and also not placebo-controlled. That means, for example, that the pet doesn't get a sugar pill in place of the promising drug. Sometimes pets undergo the current standard therapy for their illness, in addition to the experimental therapy that researchers hope will improve outcomes.

MYTH #3: PARTICIPATION IS TOO EXPENSIVE

Many people don't have health insurance for their pets, and paying out of pocket for advanced care can be a financial burden. "Clinical trials may offer the opportunity to access state-of-the-art care at little to no cost," London said. "The majority of our studies offer some sort of financial support—in many cases, they're completely free."

Often, there's also a reimbursement in the form of an "in-store credit" for participating in a study. For example, a dog with a soft-tissue sarcoma might receive immunotherapy in a study and then, after blood tests and a biopsy, the owner could receive $2,000 toward the removal of the dog's tumor. The goal is to defray a significant part of the typical cost for the standard treatment.

MYTH #4: CLINICAL TRIALS ARE ONLY FOR TREATING CANCER

Clinical trials are available for a wide variety of diseases in smaller animals, such as dogs and cats, as well as horses and farm animals. Trials now ongoing at Cummings School include those advancing our understanding of cardiac conditions, kidney and liver diseases, arthritis, skin and orthopedic problems, and neurological conditions.

You can find open studies at Cummings School through its clinical trial website (https://sites.tufts.edu/vetclinicaltrials), and search for other available studies through the American Veterinary Medical Association's Animal Health Studies Database (https://ebusiness.avma.org/aahsd/study_search.aspx).

MYTH #5: CLINICAL TRIALS AREN'T AVAILABLE NEARBY

While geographic proximity is important, pet owners might have more options than they realize—some studies have as many as 10 participating sites nationwide. And to mitigate the strain of travel on owners, researchers can sometimes partner with a specialty practice closer to the homes of animal owners.

MYTH #6: TRIALS ONLY HELP A SMALL NUMBER OF PETS

Owners often initially seek out clinical trials for their sick pets in hopes that they will benefit from a cutting-edge treatment before it is widely available. But there's another benefit that often becomes a source of pride: Being involved with research means playing an essential part in advancing science that can improve the well-being of all animals—and possibly the well-being of people, too. "Often our clinical trials have a dual purpose in that we don't just learn something new about animal health; we advance of our understanding of human health as well," London said. "It's a win-win."

THE PROMISE OF IMMUNOTHERAPY

Two new clinical trials at Cummings School seek to advance the development of promising new therapies that use the body's immune system to fight cancer. The work is funded by more than $5 million in grants from the National Cancer Institute of the National Institutes of Health through the Cancer Moonshot initiative—and part of a larger effort to study how immune therapies work in dogs with naturally occurring cancer to improve similar approaches in people.

The first grant is a collaborative effort between Tufts and Cornell University to evaluate new combinations of immune therapies for treating canine B cell lymphoma, one of the most common tumors in dogs. As canine and human B cell lymphoma are closely related, the goal is to develop a chemotherapy-free treatment regimen that results in long-term survival in dogs, and then use these findings to design future human clinical trials.

The second grant is a collaborative effort between Tufts and Colorado State University focused on osteosarcoma, a bone cancer in both dogs and children, for which no therapeutic improvements have occurred in over 30 years. The purpose of this work is to screen the effectiveness of four new immunotherapy drug combinations in treating and ultimately preventing spread of osteosarcoma to the lungs.

For more information on clinical trials, email clinicaltrials@tufts.edu.

No Excuse to Hibernate

Assistant professor JONATHAN BABYAK, V09, an emergency and critical-care veterinarian at the Henry and Lois Foster Hospital for Small Animals, responds to a reader question about how to safely exercise dogs when the weather turns nasty.

Q *During the winter months, how do I protect my dog from extreme cold, ice, salt, and chemical deicers?*

A Dogs are just like people in that they have varying tolerance for different temperatures and ground conditions. Some dogs can run around in the snow for hours, and they actually end up panting—their version of sweating—from all the activity. Others start shivering and pulling at the leash to go back indoors after being outside for only a few minutes.

There's really no cut-off temperature for it being too chilly to take your dog outside. However, you should always watch your pet carefully for cues that it's too cold and act accordingly—some pets benefit from a jacket and even snow booties.

Never leave your dog alone in the cold or inclement weather, as he could develop hypothermia, a veterinary emergency.

You don't need to stress too much about protecting your dog's paws from salt and chemical deicers. If he were to eat a bag of these products, yes, that would cause real trouble and warrant a trip to the veterinary ER. But if your dog licks a little off the bottoms of his paws, he will (at worst) experience an upset stomach. You can avoid this by wiping off his paw pads with a damp washcloth after each walk.

Some dogs do tend to collect ice and snow between their toes. Signs of that include prancing in place, shifting weight from one foot to another, and biting at the cold bits between their toes. There are lots of products available to help repel water and keep paws comfortable. Vaseline is nontoxic and safe to use, though I recommend wiping it off afterward as it can cause minor stomach upset (my own dog accidentally ate an entire jar of it recently and had terrible diarrhea for days).

Every veterinarian will agree that tired dogs are good dogs. So unless your pet is so small that it can adequately exercise in your house, going outdoors is essential. Exercise stimulates dogs mentally and provides bonding opportunities with their owners, while getting out excess energy and providing numerous health benefits, just as it does in people. While we may want to hibernate in winter, it's important to stay as active as possible with your dog.

Please email your questions for "Ask the Vet" to Genevieve Rajewski, the editor of this magazine, at genevieve.rajewski@tufts.edu. Because of the volume of inquiries, we cannot respond to all submissions. For any pet health issue, owners should contact their veterinarian.

If you are interested in learning more about how you can support Cummings School of Veterinary Medicine, contact the Office of Development and Alumni Relations, at 508.839.7905, or vetfund@tufts.edu.

HOW TO REACH US

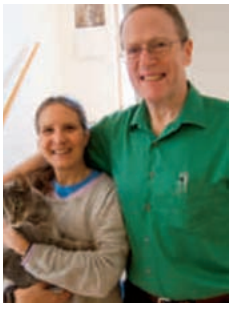
Henry and Lois Foster Hospital for Small Animals	508.839.5395
Hospital for Large Animals	508.887.4840
Tufts Ambulatory Service, Woodstock, CT.	860.974.2780
Tufts Veterinary Emergency and Treatment Specialties, Walpole, MA	508.668.5454
Wildlife Clinic	508.839.7918
Veterinary Student Admissions Office	508.839.7920
Cummings School Alumni Relations Office	508.839.7909
Tufts Pet Loss Support Hotline	508.839.7966
Cummings Veterinary Fund	508.839.7902

ILLUSTRATION: MARTIN LEÓN BARRETO

“We give annually.

It just seemed like a natural step to support Cummings School into the future.”

Laurette Bradley and Gus Uht remain forever grateful for the care their cat, Rita, received at the Henry and Lois Foster Hospital for Small Animals. With the help of the dedicated veterinary professionals on staff, they were able to spend another year with Rita before she passed. In gratitude, they have named Cummings School in their wills to provide financial assistance to ownerless animals and low-income families. Laurette and Gus also continue to support Cummings School annually, and there is now an exam room at Tufts at Tech Community Veterinary Clinic in Worcester named for Ego, another beloved cat and family member. Gus explains their support for this innovative Cummings School teaching facility with these words: “If we can help one or two cats, that’s great. But if we can advance the work of the school, we can help even more.”



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HELPFUL READING BUDDIES

Young readers may find delight in a school book when reading it to relaxed and nonjudgmental dog. A recently published study about a dog-assisted reading project in a Grafton, Massachusetts, public school found that when dogs were brought into an after-school program for second graders, the children reported improved attitudes about reading.

FOR MORE ON THE STORY, TURN TO PAGE 8

PHOTO: ALONSO NICHOLS