



# One Medicine?

At the University and the zoo, Rochester veterinarians advance human, environmental, and animal health simultaneously.

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THE RITUAL BEGINS ON THE PATH THAT CURVES ALONG THE NORTHERN EDGE OF ROCHESTER'S Seneca Park Zoo. Set away from the animals, it's a place for deliveries and transport. Early in the morning, a truck has come to deliver a load of willow branches, which now sit in mounds along the path's grassy curb.

Jeff Wyatt '95M (MPH), the zoo's chief veterinarian, and his colleague, veterinarian Louis DiVincenti, each grab a fistful of branches and head up the hill to greet the orangutans. There are three at the zoo: the 33-year-old matriarch, Kumang; her 13-year-old daughter, Dara; and Denda, an 11-year-old male who arrived in 2011.

Wyatt greets Dara first. She bounds toward him. He crouches close to the wire mesh, clutching the bouquet of willow branches, and whispers in her ear.

"She's a big flirt," DiVincenti says, looking on, and handing large chunks of vegetables to Denda. He notes that Dara, rust-colored herself, shows a propensity for redheads.

In the moments since Wyatt and DiVincenti have arrived, a small group of visitors has gathered. Wyatt introduces himself and the orangutans, and begins to chat with the group. Turning to Kumang, he has her open her mouth and say "ah."

"Denda's trained to pee in a cup!" he says next to his audience of rapt preschoolers.

Wyatt and DiVincenti are beginning their usual morning rounds. They'll spend much

**SAY 'AH':** Jeff Wyatt, veterinarian at the Seneca Park Zoo and the Medical Center, takes a peek at Kumang (opposite), a Bornean orangutan; Wyatt examines an X-ray of Jefferson (above), an olive baboon, before removing a nasal mass.





of their time talking, feeding, and playing games with the animals. The games will often consist of asking the animals to perform certain behaviors—such as opening mouths and lifting feet—that will make it easier for the veterinarians to perform basic examinations. To deliver care to animals—any animals, but especially ones who are large or ones who are smart, like orangutans, sea lions, elephants, to name just a few—requires building trust. Before the rounds are over, Wyatt and DiVincenti will have looked into the noses, ears, mouths (and other key orifices) of elephants and sea lions, and performed a minor procedure on a baboon.

Their work at the zoo is only part of their job. Wyatt and DiVincenti also serve in the Medical Center's Department of Comparative Medicine, where they join two other veterinarians in overseeing the care of laboratory animals and working "shoulder to shoulder" with researchers, DiVincenti says, as part of biomedical research teams.

They've installed ventricular assist devices in cows. Helped researchers studying the papilloma virus obtain tissue samples across species. Assisted researchers using chinchillas in hearing research. ("A chinchilla has the same number of turns in its inner ear as humans," Wyatt explains.)

Both have completed studies that have earned them Medical Center degrees—Wyatt has a master's degree in public health, and DiVincenti will be awarded a master's degree in clinical and translational research, a new program, in 2014.

Wyatt and DiVincenti both say that their dual role is unusual. And as some public health officials around the world increasingly call for closer collaboration between medical and veterinary profes-

sionals, Wyatt's and DiVincenti's breadth of experience may prove invaluable.

In 2006, the American Medical Association, the Animal Veterinary Medical Association, the Centers for Disease Control and Prevention, and other professional and public health organizations built a partnership around the concept "One World, One Medicine, One Health." Representatives from the organizations created a task force to develop what they called the "One Health Initiative." The initiative was to launch "a movement" dedicated to building collaborative alliances among doctors, veterinarians, and environmental scientists.

This past fall, the World Medical Association and World Veterinary Association followed up by signing a Memorandum of Understanding, pledging support for the One Health Initiative and urging cooperation and collaboration in education, clinical care, and research.

From the outset, the One Health Initiative has been driven by two insights. The first is that a large and increasing percentage of infectious diseases identified in humans begin in animals. According to the One Health Initiative Task Force Report, 60 percent of infectious diseases in humans originated in animals and three-quarters of the infectious diseases that have emerged in the past three decades originated in animals.

The second insight is the broader recognition that human, animal, and environmental health are interrelated.

**FOOD AND GAMES:** With a bucket of fish treats close at hand, Wyatt and Seneca Park Zoo zoologist Mary Ellen Ostrander lead Flounder, a California sea lion, through some basic behaviors.



Not surprisingly, the notion that the fortunes of people, animals, and the planet are interrelated enjoys widespread currency. But acting on its implications means that institutional and professional conventions must evolve. “We’ve been siloed for far too long,” says Nancy Bennett, vice president at the Medical Center and director of the University’s Center for Community Health, of the physician and veterinary communities.

Bennett knows firsthand the kinds of contributions veterinarians can make to human health. In the early 1990s, as upstate New York was experiencing an apparent raccoon rabies outbreak, Wyatt led a study of the epidemiology of human exposure to rabies.

“What we were trying to understand was the nature of the exposures that people had to potentially rabid animals,” says Bennett. “Jeff’s work really helped us understand the patterns of exposure.”

For zoo vets, the slogan “One World, One Medicine, One Health” resonates almost intuitively. For one thing, they’re far more attuned than the average physician to thinking about habitat.

Wyatt grew up in Cincinnati, home to one of the oldest and largest American zoos. As a youth, he volunteered in an education program for visitors. “We were conveying conservation messages back in 1972 and 1973,” he says.

But that message has changed in important ways. In the past decade or so, Wyatt says, conservationists have begun to recognize that no animal or environmental conservation program will succeed unless it addresses human needs.

It’s a message he’s used to delivering at the zoo. Back by the orangutan exhibit, Kumang, her fingers wound around the wire mesh, is growing restless as Wyatt’s attention has turned to the

visitors. Propelled by her 200-lb. heft, she issues an arresting grunt.

“She’s tired of this story,” Wyatt tells the group.

The story is about the critical endangerment of orangutans. Wyatt talks about measures the zoo is taking, with help from Medical Center physicians, to keep Kumang, Denda, and Dara as healthy as possible. Orangutans are susceptible to heart disease, and in 2011, Dara was examined at the zoo animal hospital by Medical Center cardiologist Karl Schwartz, who gave her an echocardiogram, giving Dara’s heart a clean bill of health.

But their counterparts in the wild are facing dire conditions. Members of the family of great apes—humankind’s closest kin—their population is falling fast.

While they once thrived across much of southern Asia, orangutans are now found in the wild in only two places: the Indonesian islands of Borneo and Sumatra.

Rapid deforestation on both islands is destroying their habitat. On the island of Borneo, orangutans can be found roaming amidst fallen and decaying trees strewn across muddy stretches of land. Within those same stretches are pools of standing water that have made diseases such as malaria, dysentery, and upper respiratory illness significant challenges to human health.

Two years ago, the Seneca Park Zoo began working with an organization in Portland, Ore., called Health in Harmony. The nonprofit

**TALK TO ME:** With Seneca Park Zoo elephant manager Lindsay Bronson looking on, Wyatt examines the African elephant Genny-C as part of his morning rounds. A highly intelligent mammal, Genny-C responds to more than 50 verbal commands.

enjoys official partnerships with Yale and Stanford universities, as well as several zoos and foundations. The group's mission is to improve the health of people, endangered animals, and their shared habitat simultaneously by helping to secure medical care and to build alternative, sustainable industries in areas of environmental degradation.

The organization has been working with villagers in Borneo, where illegal logging and the development of palm oil plantations have destroyed much of the orangutans' habitat, to develop a conservation model that can be used around the globe. Last fall, Wyatt invited the organization's executive director, Michelle Bussard, to the Medical Center to talk with physicians and residents about the organization's work.

Bussard told the group that the reason the environmental destruction is taking place is very clear. "It's a destructive cycle that starts with inadequate health care, which leads to debt, which leads to environmental degradation."

To save a child, for example, or to restore an injured breadwinner to health, an Indonesian family will do whatever it takes to gather the means for care—including assisting industries that are harm-

School of Medicine and Dentistry's international emergency medicine fellowship.

"Jeff contacted me because he was looking to build on this idea of connecting human health with habitat preservation and primate conservation," Adler says.

Initially, Wyatt was seeking to identify physicians who might be willing to go to Borneo to provide health care. Adler knew that emergency physicians would be ideal, because they're trained to work in suboptimal conditions. And in his role as a mentor, he knew that residents would find work in Borneo a valuable experience.

But he grasped Wyatt's broader message as well.

"It's not as if human beings are dependent on a primate for their direct well-being," says Adler. "But they share a habitat, and habitat health is important for both, because habitat provides the sustenance, whether it's nutritional or pharmacologic or environmental."

Wyatt and DiVincenti have delivered that same message elsewhere in the Medical Center. And their efforts, after a few "false starts," according to Thomas Pearson, principal investigator at the University's Clinical and Translational Science Institute, have started to bear fruit.

In his office in the Saunders Research Building, Pearson's face lights up at the mention of the names Wyatt and DiVincenti. He encountered Wyatt for the first time when a proposal for institute funding came across his desk from the Department of Comparative Medicine. It was an application for a small voucher program designed to provide investigator teams with up to 10 hours of specialist consultation in support of a research project. Approvals are virtually automatic, according to Pearson, assessed only for their relevance to the institute's mission. As articulated by the National Institutes of Health, that mission is "to accelerate the process of translating laboratory discoveries into treatments for patients."

The application from the University's veterinarians "created quite a stir," Pearson recalls. "They were looking at ambient nitrogen levels in vivariums, and some of my staff felt that they were not eligible for our funding."

After some deliberations at the institute, the application was approved. "The patients have funny little ears and long tails, but they're still patients, and so from a veterinary medicine standpoint, it's still applied," Pearson says.

Not too long after, Pearson encountered DiVincenti in a grant-writing class he was teaching, designed for Medical Center investigators. The course has helped many University scientists win their first large grants, and he says he was a bit startled when DiVincenti's proposal crossed his desk. "Here I was reading all of these papers about anemia, obesity studies, and cancer treatments, and then here's this study on sturgeon."

Sturgeon are a species of fish that predate dinosaurs and live only in the Northern Hemisphere. Among the varieties of sturgeon are so-called lake sturgeon, which inhabit the Great Lakes and the broader system of rivers and lakes in the region.

As a result of industrial pollution, by the mid-20th century sturgeon had all but disappeared from the Lower Genesee River, the portion of the river that runs from Downtown Rochester into Lake Ontario. As part of a quest to repopulate the river with sturgeon, the U.S. Geological Survey and the New York State Department of



**FISHING:** On the Genesee River with Wyatt and Emily Waldt of the U.S. Geological Survey, veterinarian Louis DiVincenti shows a sturgeon thriving in the once uninhabitable river.

ful to the environment, illegal, or both.

As Bussard was in Rochester, DiVincenti was in Borneo, where he brought medical supplies, and where he performed a consulting role with Indone-

sian vets and an advocacy role for the program. In 2011, Wyatt traveled to the island to help provide care to cattle and goats being raised by small family farmers for milk, meat, fiber, and manure for organic farming. And this fall, he was with Bussard, hoping to recruit physicians to share knowledge with Indonesian physicians delivering care to villagers living on the edge of Gunung Palung National Park, home to 10 percent of the world's last wild Bornean orangutans.

Among the physicians at the gathering was David Adler, an assistant professor of both emergency medicine and community and preventive medicine. A specialist in the prevention of infectious diseases in the developing world, Adler oversees the



Environmental Conservation released a total of 2,000 baby sturgeon into the Lower Genesee in 2003 and 2004 and have periodically gauged the population's growth.

Wyatt latched onto the project as a conservation story for the zoo to tell. After all, the Lower Genesee was right in their backyard. But the survey only involved netting the fish, measuring their length and weight, tagging them, and returning them to the water.

In fall 2010, Wyatt and DiVincenti began talking about what other data they might gather from the sturgeon. For example, they could take blood samples of the sturgeon to gauge the health of the ecosystem. The proposal that crossed Pearson's desk—and later won a \$300,000 grant from the Environmental Protection Agency—proposed sampling the sturgeon's blood for a variety of pollutants.

Sturgeon provide a unique opportunity to measure toxicants. They're "bottom-feeders," living and feeding within the sediment where contaminants settle. They live a century, on average, meaning that baseline data can be used to measure progress in the very same animal across a span of 50, and possibly of 100, years.

DiVincenti says they could have applied for a grant through the zoo, but chose the University instead. "It was a very conscious thing to do it through the U of R. It was all about creating a bridge between animal, environmental, and human health—about showing that this is a human environmental health problem, and not a sturgeon problem."

Pearson was impressed. "Only a veterinarian or a wildlife biologist would have understood all of the characteristics of that species in that setting in order to apply it for that application," he says. "You could sample water from now until Kingdom Come, and you

wouldn't get a better view of the clean-up of the Genesee. I don't think at this point anyone even blinked that this wasn't relevant to translational medicine."

Pearson, who is a clinical and research physician specializing in cardiovascular disease, says he's worked with veterinarians in his laboratory over the years. Their understanding of animal anatomy, physiology, and disease processes have aided his research on cardiovascular disease in humans. But today, he characterizes their role not only as supportive, but integral.

"They're not only providers of care to their patients, but also key to this whole area of comparative science," he says. That Wyatt and DiVincenti are experienced veterinarians of exotic animal species makes their contribution all the more valuable. "Their role at the zoo is very interesting. If you have a small animal practice, you probably would be able to tell me all about cats and dogs. But these two? Armadillos! Orangutans! All kinds of animal systems."

Reflecting on the One Health Initiative, Pearson says it's right in line with what the Clinical and Translational Science Institute is designed to do. "We're taking basic discoveries and translating them to applications that are relevant to human health. And the subtext to that is to really break out of the usual boxes we're in, where we say, 'Oh, you can't work with the nurses,' or 'Oh, the vets. You can't let them out of the vivarium.'"

"Away with that," he says, flinging his arms wide into the air. 🗣️

**EXAMINING JEFFERSON:** Wyatt and DiVincenti (right) prepare to remove a nasal mass from Jefferson, one of the Seneca Park Zoo's several olive baboons.