"Something tells me it’s all happening at the zoo," Simon and Garfunkel once sang. That was certainly the case for a team of health care providers jammed into a small room on a recent late June morning. They were gathered for a rare opportunity: to examine a full-grown orangutan.

Lawrence Hergott, MD, director of outpatient clinical services for the University of Colorado Hospital’s Cardiac & Vascular Center, was among a dozen providers at the Denver Zoo’s animal hospital circling the 162-pound, 21-year-old female named Nias, as she slumbered under the influence of general anesthesia. They filled a variety of roles – Hergott’s was to conduct a cardiology exam, including an EKG to test the animal’s heart rhythms – but they were united in one goal: to help ensure the safety of an endangered species.

“Our main goal is to make sure the animal is safe,” says Hergott, who has examined 12 great apes over the past half-dozen years, including seven orangutans and five gorillas (Insider, November 4, 2008).
Precious data. Hergott and the zoo will submit information from the most recent examination to a national registry on primates that has gathered data from more than 100 conducted on great apes nationwide since 2006. Hergott says the registry is an invaluable resource for those dedicated to preserving the species.

“We want to identify behaviors that indicate an animal is getting sick or whether we should worry about the thickness of the heart muscle, for example,” he notes. “It’s good preventive medicine.”

The apes, whose hearts are virtually identical to those of humans, can suffer from potentially fatal cardiac problems, Hergott remarks. “In captivity they die of the same diseases humans do, such as heart failure, which makes them swell up with fluids.” They are treated with the same drugs used on humans, he adds.

The zoo calls Hergott and an anesthesiologist from The Children’s Hospital when it needs to put one of its great apes under general anesthesia. Hergott rounds up a team from UCH and Exempla Lutheran Medical Center for the cardiovascular exam.

Extensive exam. In Nias’s case, vets were removing two birth-control implants from her shoulder, giving the rest of the team an opportunity to conduct an extensive two-hour exam that included checking her vital signs, blood pressure, heart rate and blood oxygen levels, listening to her lungs, and more.

“Everything on the echocardiogram was fine. Her heart was pumping well; she has good valves.”
abdomen and heart, monitoring her blood flow, taking an echocardiogram of her heart and examining her teeth.

They even carefully checked the range of motion of her joints. “She’s lost a little bit in her right ankle,” one vet said during the exam. “That’s to be expected in a middle-age animal.”

The room hummed with activity from the moment Nias arrived by ambulance and was brought in on a stretcher and laid on the examination table. Anesthesiologists carefully monitored her breathing throughout the examination.

“It’s absolutely critical to protect the airway of an orangutan,” Hergott notes. “They have a big air sac under their chin that can pinch off the airway, which is relatively small.”

**Getting in rhythm.** Getting an EKG presented some challenges too. One of them was anatomical. “Their heart is shifted to the right, and their chest is wider and flatter than a human’s,” Hergott says.

“You can’t use a conventional placement of electrodes,” says Mason Madrid, UCH Ancillary Health Technician coordinator who, along with Cardiac & Vascular Center nurse practitioner Patrice Spurck, RN, MS, ANP, assisted Hergott. “It’s a little bit tougher because of the configuration of the chest, and
their heart is bigger and situated differently than a human’s.”

Madrid says looking at a chest x-ray of the orangutan heart helped him figure out how to place the electrodes. “I counted down the number of ribs,” he says.

The anesthesia Nias received also made it more difficult initially to get a good heart signal. Hergott says she received two anesthetics; the second lowered her heart rate and blood pressure.

“The second one suppressed the normal ‘pacemaker’ in her heart and made her blood pressure a little bit low,” Hergott notes.

In response, the team administered atropine intravenously to elevate the blood pressure and activate the animal’s normal pacemaker. That didn’t come easily, however. Felicia Knightley, a senior veterinarian at Denver Zoo, labored to administer the IV.

“When her blood pressure drops, it’s hard to find a vein that will stand up,” she said.

**Things get hairy.** That problem solved, the thick hair covering Nias’s body made it hard to attach the electrodes that would convey signals from the heart.

The answer? Electric shavers. “We were having trouble getting signals, but we didn’t want to leave big bare spots on her body,” Madrid says. After a few careful trims, he adds, the team was able to make good contacts that produced “beautiful signals,” that Hergott noted approvingly.

“Knowing we got the best EKG Dr. Hergott had seen made us feel good, especially because the reason we are doing it is to save great apes,” Madrid remarks.
Looking for an echo. The effort to secure an echocardiogram produced some unexpected drama when the imaging machine wouldn’t boot up. “It would have been heartbreaking not to get those images,” Hergott says.

The team made a last-minute save, however, getting a machine that was at a colleague’s home near the Botanic Gardens. The second attempt produced good images.

“Everything on the echocardiogram was fine,” Hergott says. “Her heart was pumping well; she has good valves.”

“The last three we’ve gotten have been the best ever,” he adds. “The pinnacle of our participation in these exams is sending good cardiac images to the registry.”

The dental team also pronounced her in good oral health. “Just a few chips,” said dentist Pete Emily. “Cleanest primate mouth I’ve seen in a long time, better than a lot of human ones,” he added to general laughter.

His twelfth examination of a great ape produced familiar feelings, Hergott reflected.

“I thought it was routine at first,” he said. “But when they wheeled [Nias] in, I got into it and saw her totally as an individual. It was energizing and stimulating. It’s such a privilege to do this,” he added. “If there’s a pause in the work, you think about the wonder of being in the presence of this animal and being responsible for her welfare.”