William C. Satterfield, D.V.M.

Interview #19

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William C. Satterfield, D.V.M.

Interview #19

Interview Profile

Interview Information:

Two interview sessions: 24 and 25 July 2012
Total approximate duration: 3 hours 20 minutes
Interviewer: Tacey A. Rosolowski, Ph.D.

For a CV, biosketch, and other support materials, contact:

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About the Interview Subject:

William C. Satterfield, D.V.M. (b. 1942; Lexington, Kentucky) came to the MD Anderson in 1983 to serve as an Attending Veterinarian and Assistant Professor at the Michale E. Keeling Center for Comparative Medicine and Research located in Bastrop, Texas. He is a Professor in the Department of Veterinary Sciences and has held the position of Chief of Livestock and Land Management in that department since 1986. He has served as Chief of the Chimpanzee Biomedical Research Resource and has been involved with sustaining the Keeling Center chimpanzee colony since he arrived.

Major Topics Covered:

Personal and educational background

The role of veterinarians in collaborative research

Use of animals in research: practicalities and controversy; care and protections for animals

MD Anderson's chimpanzee colony

Research collaborations: HIV, hepatitis C, ovarian cancer, tissue engineering

The Michale Keeling Center and MD Anderson: laboratory practice, care of animals

Cattlemen for Cancer Research: philanthropic support of MD Anderson

University of Texas MD Anderson Cancer Center
Making Cancer History Voices® Oral History Project

Research Medical Library: Historical Resources Center

ORIGINAL Interview Profile #19: William C. Satterfield, D.V.M.
Submitted by: Tacey A. Rosolowski, Ph.D.
Date Revised: 11 June 2014

This interview of Dr. William C. Satterfield, D.V.M. (b. 1942; Lexington, Kentucky) takes place in two sessions (approx 3:20 total) on 24 and 25 July 2012 at MD Anderson's Michale E. Keeling Center for Comparative Medicine and Research located in Bastrop, Texas. Tacey A. Rosolowski, Ph.D. is the interviewer.

Dr. Satterfield came to the Keeling Center in 1983 as an Attending Veterinarian and Assistant Professor. He is currently a Professor in the Department of Veterinary Sciences and since 1986 has held the position of Chief of Livestock and Land Management in that same department. He has served as Chief of the Chimpanzee Biomedical Research Resource and has been involved with sustaining the Keeling Center chimpanzee colony since he arrived.

Dr. Satterfield received his B.S. in Zoology and Chemistry in 1965 from Florida State University in Tallahassee, Florida. He went on to Auburn University in Auburn, Alabama for his D.V.M. (conferred in 1969) then took postgraduate training for two years (1978-'79) in Foreign Animal Diseases at the U.S. Dept of Agriculture. During this period (from 1971 – 1982) he was also employed as the Director of Biomedical Programs at the Boston Zoological Society (the Franklin Park Zoo) in Boston, Massachusetts. (Dr. Satterfield notes that he was one of the few veterinarians fully employed at a zoo at that time.) Prior to joining MD Anderson, Dr. Satterfield taught as a clinical assistant and then as an assistant professor (1980-'83) at the Tufts New England Med Center School of Vet Medicine, while simultaneously holding a research assistantship (1981-'84) at the Department of Defense Wildlife Field Research conducted through the Harvard School of Tropical Medicine in Boston, Massachusetts.

In this interview, Dr. Satterfield emphasizes that veterinarians serve much more than a support function and take an active role in collaboration and research with other MD Anderson investigators. He discusses the wide variety of collaborative research projects he has worked on over the course of his career (e.g. HIV, ovarian cancer, tissue engineering). He also speaks in detail about the care given to animals at the Keeling Center and is eloquent about their importance as the "unsung heroes" of medical research.

William C. Satterfield, D.V.M.

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William C. Satterfield, D.V.M.

Interview #19

Segment Summaries

Session One: 24 July 2012

Segment 00A
Interview Identifier

Segment 01
A Unique Institution: The Michale E. Keeling Center for Comparative Medicine
B: Overview

Story Codes
B: Institutional Processes
B: MD Anderson Snapshot
B: Multi-disciplinary Approaches
C: Collaborations

In this segment, Dr. Satterfield explains that the Michale E. Keeling Center for Comparative Medicine provides a variety of resources and services to physician-scientists at MD Anderson and the Texas Medical Center. He focuses in particular on the animal models using mice, sheep, chimpanzees and many other kinds of animals that enable experimentation with drugs, the mechanisms of cancer, and many other studies. These, in turn, provide the basis for translational research leading to therapies useful for human patients. In addition, the Center provides medical and surgical expertise for handling research animals as well as expertise in the many guidelines researchers must follow to comply with FDA regulations. He notes that the Keeling Center is a unique institution where veterinarians do more than provide clinical care and advance science. As an example, he describes his collaborative work with the Department of Neurosurgery studying the treatment of neuropathic pain in cancer patients.

Segment 02
Why Animals are Important in Cancer Research: Controversy Over Using Animals
A: Overview

Story Codes
A: Overview
A: Definitions, Explanations, Translations
D: Understanding Cancer, the History of Science, Cancer Research
B: Building/Transforming the Institution
C: Controversies
C: Cancer and Disease
D: Ethics

In this segment, Dr. Satterfield explains some basic terms and describes how biological and genetic similarities make it possible for animals to serve as stand-ins for humans in experiments. He also notes some of the characteristics scientists look for to determine whether a particular animal will offer a good model for a specific disease or condition presents itself in humans. He then explains that animals are critical to the study of cancer because the disease is so complex and expresses itself in so many ways. He notes that rhesus monkeys, for example, can spontaneously develop colon cancer just like humans, whereas other animals do not. There is tremendous individuality in animals, just as there is in cancer. He says that if computers can eventually create a replica/model of a living organism, perhaps animal studies will no longer be needed. But he doubts that a computer could ever model anything so sophisticated. One of his roles, he says, is to help investigators select the correct animal models for their studies in order to most effectively lead to treatments for humans.

Dr Satterfield next acknowledges that many people believe that animal experimentation – particularly with higher primates- is controversial and perhaps even immoral. He says he appreciates the controversy, but states that "it's ok if we inconvenience a few animals to help millions of people." The death of one of their research animals is a personal loss, and the staff cares deeply for all the animals at the Center. He then talks about studies of hepatitis C using chimpanzees (the only animals other than humans who can carry the disease), noting that a year and a half ago they cleared a chimp of hepatitis C. Dr. Satterfield then details the many ways that the Keeling Center cares for experimental animals: with yearly check ups, cardiac exams, and even geriatric medicine for the aging chimpanzee population. (In 1995, the NIH placed a moratorium on breeding chimpanzees, so the population is aging. IN addition, chimpanzees are not euthanized at the end of studies, as are other animals.) He also notes a case in which an experiment with a monoclonal antibody killed a chimpanzee, thus preventing that drug from being tested on human beings.

Segment 03
Broad Experience and an Interest in Immunology Creates a Path to MD Anderson
A: Educational Path

Story Codes
A: Personal Background
A: Professional Path
A: Inspirations to Practice Science/Medicine
A: Influences from People and Life Experiences
A: Joining MD Anderson
A: The Researcher
B: MD Anderson History
B: Philanthropy, Fundraising, Donations, Volunteers
B: Building/Transforming the Institution

In this segment, Dr. Satterfield briefly sketches his educational path and notes that when he assumed the position of Veterinarian at the Boston Zoo, he was one of the few fully employed zoo vets at the time. He also talks about his family background, noting that he elected to go into veterinary medicine because of his mother's love of animals and her support for his habit of bringing home strays. He then lists his unique professional experiences. During his postgraduate training through the School of Veterinary Medicine at Harvard, for example, he worked with basic scientists who were looking at the transmission of disease. He acquired wide

clinical experience working on animals as varied as fish, elephants, and primates. All this experience kindled his interest in basic biology and immunology. This will put him in a unique position to be recruited for MD Anderson's Keeling Center.

Dr. Satterfield describes how he was offered the opportunity to come to MD Anderson in 1983 to study the very poorly understood disease, AIDS, and try to develop treatments based on the model of hepatitis B. He worked with chimpanzees, and tells the story of how the NIH was looking for a place to transfer its community of primates. R. Lee Clark found a donor to give one million dollars to bring the chimpanzees to MD Anderson, and he worked with Dr. Michale Keeling and Dr. Kenneth Riddle to create the chimpanzee program. He concludes this section with a brief discussion of research he conducted with the Department of Defense: this led to the discovery of a monoclonal antibody that defends against smallpox and that is now part of the anti-bioterrorism "National Stockpile."

Segment 04
The Keeling Center and Research on HIV and Hepatitis C
B: An Institutional Unit

Story Codes
A: Joining MD Anderson
B: MD Anderson History
B: Building/Transforming the Institution
B: MD Anderson Snapshot
A: The Researcher
C: Discovery and Success
C: Collaborations
A: Overview
A: Definitions, Explanations, Translations

Dr. Satterfield recalls how small the Keeling Center was when he arrived in Bastrop and the many challenges he faced caging animals. He recalls the urgent need to create adequate bio-security provisions, as no one knew how AIDS was transmitted. He also notes that because Bastrop is a remote facility, many researchers in Houston didn't know of their existence (and still do not), but are grateful to discover all the resources they offer. He describes how the faculty grew and became an incubator for collaboration. As an example, he talks about the over 40 protocols conducted with the NIH on hepatitis C and AIDS, which led to the discovery that AIDS is a retrovirus. Dr. Satterfield then goes into detail about his work on hepatitis C, talking about how he and collaborators tested clones of the six strains of the virus to develop a resource for future testing of vaccines. He also notes his work on hepatitis B and D. He returns briefly to talk about the "watershed" hepatitis C study that resulted in a chimpanzee being cleared of the disease. He closes this segment by talking about medical conditions that will disqualify an animal from being included in a study.

Segment 05
A Father Who Beats Cancer
A: Personal Background

Story Codes
A: Personal Background

A: Inspirations to Practice Science/Medicine
A: Influences from People and Life Experiences
C: Human Stories
C: Patients

In this very personal segment, Dr. Satterfield recalls that in 1987 his father was diagnosed with lymphoma and all the physicians he had seen "had written him off." Dr. Satterfield was able to have his father seen at MD Anderson and was still doing well in 1995. (Mr. Henry C. Satterfield died in an auto accident.) Dr. Satterfield explains that when he arrived at MD Anderson in 1983, he thought he would stay four years or so and move on. However, this personal experience with cancer galvanized his commitment to cancer research. "We do a little," he says, "but everybody does and it adds up to a lot." He also recalls MD Anderson neurosurgeon, Dr. Samuel Hassenbusch, who died of cancer (the same cancer he studied). Dr. Satterfield collaborated with Dr. Hassenbusch and recalls him very fondly. Dr. Satterfield again says that the Keeling Center offers faculty a tremendous opportunity to enjoy work, stimulating colleagues, and a sense of purpose.

Segment 06
The Cattlemen for Cancer Research --Community Philanthropists
B: Giving to/Fundraising at MD Anderson

Story Codes
A: Activities Outside Institution
B: Philanthropy, Fundraising, Donations, Volunteers
C: Human Stories
C: This is MD Anderson
A: Personal Background

In this segment, Dr. Satterfield describes how in the late nineties, Dr. Keeling had a plan for raising seed money for new studies. Using his own strong connections to the community, he approached local ranchers to donate livestock for auction, and the Cattlemen for Cancer Research was born. They raised over 1 million dollars and give a percentage to an MD Anderson fund to help patients from a five-county area to pay for cancer treatment. Dr. Satterfield then talks about the Center's connection to the community, noting that it is a major employer, purchases much of its supplies locally, and also brings students from Austin Community College in for educational experiences. He then notes that the auction has become a yearly event held in the fall, with a gala being held in the spring. This cancer related fund raising has become a community tradition.

Segment 07
The Veterinarian as Research Collaborator
A: The Researcher

Story Codes
A: The Administrator
B: MD Anderson and Government
A: Overview
A: Definitions, Explanations, Translations
D: Ethics

C: Human Stories

Dr. Satterfield here talks about the role he has served as Attending Veterinarian. He explains that this title was established as a result of FDA's and the animal welfare act administered by the Animal Care and Use Committee. Though an Attending Veterinarian must report all violations of guidelines to the committee, Dr. Satterfield sees his role as a problem solver who helps investigators to think through protocols and clearly define their purposes and methods. He stresses that he sees his role as a facilitator who develops teams and fosters effective collaboration. He then describes how the FDA animal welfare regulations were set in place because of very public instances in which animals were mistreated –in some cases in the course of practicing poor science. At the time, the public also believed that pets were being used for research; he insists that MD Anderson has never used any dogs previously owned as pets for research. He notes the Tumor Referral Program, begun prior to his arrival in 1983, and run in both Bastrop and Houston, which enables the public to bring dogs suffering from canine lymphoma for treatment. He tells a touching story of a mother who brought in a dog that had belonged to her 10-year old son who had been killed. The animal was all she felt she had left of her son. Dr. Satterfield notes that the Program's purpose is to extend the life of pets.

Session Two: 25 July 2012

Segment 00B
Interview Identifier

Segment 08
The History of 'Good Laboratory Practice' at the Keeling Center
B: An Institutional Unit

Story Codes
A: Overview
A: Professional Values, Ethics, Purpose
B: Institutional Processes
B: MD Anderson Culture
C: Collaborations
D: Business of Research
B: The Business of MD Anderson

In the beginning of this segment, Dr. Satterfield notes that in his role as Attending Veterinarian for the Keeling Center he works for the good of human health and also for the highest standard of care for the animals he oversees. He underscores that research animals are "unsung heroes" in the long process of conducting research and taking drugs to the market; in his view, the FDA has a difficult job in regulating this process, and it has done a good job.

Dr. Satterfield next goes into detail about the FDA's Good Laboratory Practice [GLP] program and how the Keeling Center work to meets its criteria for quality insurance, training, documentation, and data storage –all to insure a secure and unbroken chain of experimental evidence so that other researchers can have confidence in reported methods and results and replicate experiments. As a contained unit within MD Anderson, Keeling is uniquely positioned

to guarantee secure storage of data, for example, and also security of practices by providing in-house pathology services. Dr. Satterfield also explains describes the economic context in which The Keeling Center adopted the GLP standards: the GLP program enabled MD Anderson to retain control over the discoveries (intellectual property) of its researchers, derive royalties from them, and use those funds to fuel the "engine of development." The Keeling Center, he explains, provides a piece of that development by providing animal models of use to MD Anderson researchers, as in the case of his collaboration with researchers in Plastic Surgery to engineer bone tissue. He then describes how working on projects with very high-quality research practices led him (in partnership with DR SASTRY) to propose that The Keeling Center make the investment to adopt the full GLP program.

Segment 09
The Challenges of Collaboration and Proprietary Research
A: The Researcher

Story Codes
A: The Researcher
B: Devices, Drugs, Procedures
B: Industry Partnerships
D: On Research and Researchers
D: On Pharmaceutical Companies and Industry
C: Evolution of Career
C: Professional Practice
C: The Professional at Work
B: Critical Perspectives on MD Anderson

In this segment, Dr. Satterfield mentions his collaboration with Dr. Samuel Hassenbusch, M.D. in the Department of Neurosurgery to study in a study of alternatives to opioids in the treatment of neuropathic pain. He then diverts into career issues created when a researcher works on studies with proprietary devices and compounds. He explains that when work is proprietary, it cannot be published, a serious problem when publications are one of the main criteria used at MD Anderson for tenure and promotion. Dr. Satterfield notes that he "struggles with this as a career issue." He also notes that veterinarians frequently contribute intellectually to the investigations they help support, but because they don't have laboratories, their contributions are not as easily documented. The solution, he says, is sensitivity and awareness on the part of individuals who sit on the Promotions and Tenure Committee. He mentions that Dr. James Bowen and Dr. Stephen Tomasovic [Oral History Interview] have both been aware of the problem and helpful. He also anticipates that Dr. Ronald DePinho will appreciate the contributions that veterinarians make to drug research. At the end of this segment he underscores that the faculty at The Keeling Center are collaborators in research more than service providers and that he enjoys working with others and seeing the work translated into patient-relevant practices.

Segment 10
A Career of Collaborative Studies from HIV to Tissue Engineering
A: The Researcher

Story Codes
A: The Researcher

A: Overview
A: Definitions, Explanations, Translations
C: Professional Practice
C: The Professional at Work
C: Collaborations
C: Discovery and Success
D: On Research and Researchers

Dr. Satterfield discusses his research in this segment, beginning with his collaboration with Dr. Samuel Hassenbusch, M.D. in the Department of Neurosurgery to study midazolam, an alternative to opioids in the treatment of neuropathic pain (as opioids create small tumors that add to pain and obstruct the spinal cord). He describes the tests conducted on sheep and the subcutaneous pump used to deliver the drug, a highly sophisticated device that can be controlled by telemetry. He notes that study of this system went to clinical trials several years ago.

Next he talks about the hepatitis and AIDS research conducted on chimpanzees since his arrival at MD Anderson, though he notes that it is very difficult to meet the criteria to use great apes in studies, a great loss to science in his view. At this time there is only one animal in the study of a drug that successfully cleared hepatitis C. There is also a study in progress to determine the safety of a monoclonal antibody used to treat rheumatoid arthritis and autoimmune diseases. This topic leads to an explanation of “orphan products,” drugs used very selectively for a small number of patients with rare conditions.

Dr. Satterfield then turns to his work with two gynecologic oncologists using rhesus monkeys to successfully demonstrate that oral contraceptives reduce markers for ovarian cancer. He notes that he helped the investigators select animals with ovarian cycles similar to humans as well as providing the physical services such as performing the biopsies and making slides. This discussion leads Dr. Satterfield to note that Keeling’s chimpanzee community is on oral contraceptives because of the FDA moratorium on breeding.

The next study described is the work with Dr. Miller, Chair of Plastic Surgery, who was looking for a way of recreating bony body parts using molds. Dr. Satterfield describes the process of recreating a mandible for a sheep by filling a mold with crushed bone, attaching it to the body wall so it could regenerate and grow a blood supply, then transplanting it to the jaw. This process would address clinical mandible problems in humans created by tobacco use. (The process has been used on humans in Germany.) Dr. Satterfield notes that the study was stopped 3-4 years ago. He then talks about the difficulties that physician-scientists face in sustaining a demanding research project while attending to clinical responsibilities. Dr. Satterfield explains that he sees his role as setting up a “turn-key” project where everything is prepared, saving time for the investigator who comes to Bastrop for essential tasks.

Dr. Satterfield then speaks briefly about his collaboration on a project developing cartilage surfaces for joint surface replacements. A private orthopedic pharmaceutical company funded this study in which sheep and goats were used to explore alternatives for artificial knee replacements. Finally, Dr. Satterfield talks about an ongoing NIH-funded study of a possible HIV vaccine that uses a conserved peptide to stimulate T-cells to kill the virus.

Segment 11
Managing Animals, Research, and Disasters

A: The Administrator

Story Codes
B: Building/Transforming the Institution
B: Devices, Drugs, Procedures
C: Professional Practice
C: The Professional at Work
C: Human Stories

In this segment, Dr. Satterfield reviews his administrative roles. He describes his responsibilities as Chief of Livestock and Land Management (1986 – present), noting he has been primarily involved with caring for the Center's sheep and goats, including providing surgical and radiology services, training technicians, and organizing programs that provide the State with these animals' blood products. He gives an overview of the Center's land holdings of 380 acres, most of which is pasturage. He talks briefly a Master Plan drawn up in 2004 and CIPRIT grants that have enabled the Center to serve as a research resource for drug development.

Next Dr. Satterfield describes his work with the Center's chimpanzee program. He first explains that chimpanzees are difficult to maintain because they are so intelligent, strong, and social – though they do not necessarily coexist harmoniously. The Center has a Ph.D. behavioral psychologist on staff to organize social groupings. Each chimpanzee also has a name, a medical history and a behavioral profile so the animals can be placed in healthy groupings. In his role on the External Advisory Committee (2006 – '08) Dr. Satterfield explored funding and research opportunities from outside MD Anderson, including NIH studies, and studies of aging, diabetes, and cardiac disease. His Internal Advisory Role (2007) involved reviewing programs, chimpanzee health, and the facilities. Dr. Satterfield tells a dramatic and moving story about a male chimpanzee [Tony] who escaped and was ultimately shot by an off-duty University of Texas police officer. Dr. Satterfield is clearly still upset by this memory and he notes this was "a dark period in our history." It also resulted in the Keeling Center offering raining to the UTPD for chimpanzee escapes, 99% of which occur through human error: Dr. Satterfield notes that there has been no problem in the last 4-5 years.

Segment 12
Roles that Protect Animals and the Institution
A: The Administrator

Story Codes
A: Overview
A: Definitions, Explanations, Translations
B: MD Anderson and Government
D: Understanding Cancer, the History of Science, Cancer Research
A: The Researcher
A: Career and Accomplishments

In this segment, Dr. Satterfield notes that his goal in working with the chimpanzees was to understand autoimmune responses and to advance the understanding of chimpanzees as a species. The care of this aging colony, however, has taken on a life of its own. The United States is the only country left in the world that maintains research colonies of chimpanzees. He notes that other countries outsource their research on great apes to the U.S. so they can claim

that they do not experiment on animals. Dr. Satterfield notes that the Keeling Center has been under pressure from animal rights extremists, who "data mine" –request vast amounts of information under the Public Information Act in order to disrupt the Center's operations. Dr. Satterfield underscores that great apes all over the world are so threatened that there may not be wild communities in a few generations. The colonies in captivity are irreplaceable. He believes that the NIH's ban on breeding the colonies is shortsighted and indicates that it has submitted to public pressure.

Dr. Satterfield then talks about his work on the Institutional Animal Care and Use Committee (2005 – present). He notes his work protecting MD Anderson by insuring that principle investigators meet FDA guidelines. He explains that this committee has enabled him to meet great scientists and develop productive collaborations. With budget cuts, he notes, the committee now meets via tele-conference, and this cost saving measure has hurt the collegial connection.

Next Dr. Satterfield touches on his work with the Pharmaceutical Development Center Steering Committee (2003), his role as the Center's licensed Controlled Drug Officer, and his work as the Center's representative for the Freedom on Information Act. He took on this role in response to data-mining by animal rights activists. He is responsible for reviewing all documents requested to determine what information is proprietary and can be protected by MD Anderson. He then talks briefly about his role as Deputy Director under Dr. Keeling and his role as Ad Interim Chair after Dr. Keeling's death (2003). He notes that he was a candidate for Director, but was glad when Dr. Christian Abee took the position, as we has glad not to move fully into administration.

Segment 13
Connections: Bonds with Animals and with Collaborators who Insured a Good Career
A: A View on Career and Accomplishments

Story Codes
A: Personal Background
A: Career and Accomplishments
C: Faith, Values, Beliefs
C: Collaborations

Dr. Satterfield begins this segment by looking back on the collaborators he has worked with over the years. He says he hopes that the Center will continue to support research and collaborative relationships. He also hopes that the Center will maintain a viable chimpanzee community. He says he is happy not to have any particular post-retirement plans. (He retires at the end of August 2012.) Thinking about people who have inspired him, he recalls a high school biology teacher, Mrs. Lowry, whose class was "great" and guided him to science. At the close of the interview, he speaks again about his connection to the animals he has worked with over his entire career. He returns to the shooting of the chimpanzee, Tony, and notes that the Center requested the services of an MD Anderson grief counselor to help them survive the loss –another example of the human-animal bond.

William C. Satterfield, DVM

Interview Session 1: July 24, 2012

A note on transcription and the transcript:

This interview had been transcribed according to oral history best practices to preserve the conversational quality of spoken language (rather than editing it to written standards).

The interview subject has been given the opportunity to review the transcript and make changes: any substantial departures from the audio file are indicated with brackets [ ].

In addition, the Archives may have redacted portions of the transcript and audio file in compliance with HIPAA and/or interview subject requests.

Chapter 00A
Interview Identifier

Tacey Ann Rosolowski, PhD
0:00:02
I'm Tacey Ann Rosolowski interviewing Dr. William C. Satterfield at the Michale E. Keeling Center for Comparative Medicine and Research, located in Bastrop, Texas. The Keeling Center is part of the UT MD Anderson Cancer Center. This interview is being conducted for the Making Cancer History Voices oral history project run by the Historical Resources Center at MD Anderson. Dr. Satterfield joined MD Anderson in 1983. He is a professor in the Department of Veterinary Sciences, and since 1986 he has held the position of chief of Livestock and Land Management. Is that correct?

William C. Satterfield, DVM
0:00:43
Correct.

Tacey Ann Rosolowski, PhD
0:00:45
Okay. In the Department of Veterinary Sciences, he's also attending veterinarian in that department and has served as Chief of the Chimpanzee Biomedical Research Resource.

Interview Session:01
Interview Date: July 24, 2012

William C. Satterfield, DVM
0:00:55
Correct.

Tacey Ann Rosolowski, PhD
0:00:56
Okay. This interview is taking place in Dr. Satterfield's office at the Keeling Center in Bastrop, and this is the first of two planned interview sessions. Today is July 24, and the time is just a couple of minutes after 2:00. Thank you, Dr. Satterfield, for taking the time to do this.

William C. Satterfield, DVM
0:01:15
Thank you, Tacey. It's wonderful to have you here.

Interview Session:01
Interview Date: July 24, 2012

Chapter 1
B: Overview
A Unique Institution: The Michale E. Keeling Center for Comparative Medicine

Story Codes
B: Institutional Processes
B: MD Anderson Snapshot
B: Multi-disciplinary Approaches
C: Collaborations

Tacey Ann Rosolowski, PhD
0:01:19
Well, thanks. It's great to see another part of Texas, since I'm relatively new here. I wanted to start out with a few general questions just to get a sense of what the Keeling Center is about and what your mission is here. So I wanted to ask you, what is the role that the Michale Keeling Center serves for MD Anderson and also for other institutions, because I understand that there are a variety of connections?

William C. Satterfield, DVM
0:01:45
The Keeling has historically served as a resource for MD Anderson specifically, as well as other medical institutions within the medical center and other UT [University of Texas] components. There have been investigators from all of these components that have access to our resource over the years at one time or another. Of course, my primary affiliation has been with physician researchers or physician scientists at MD Anderson as well as with the National Institute of Health, where I worked for twenty-five years with the National Institute of Allergy and Infectious Diseases with an investigator by the name of Robert Purcell, who was one of the scientists—as a physician scientist—that helped discover the hepatitis B vaccine. This has been pretty critical to my development here as well as the center because we received innumerable amount of support from NIH through that NIAID Laboratory of Infectious Disease, Hepatitis Section over the last quarter century. They've actually provided us with the resources, both in terms of facilities and scientific support, that we would not have received in any other way.

Tacey Ann Rosolowski, PhD
0:03:38
You mentioned that the Keeling Center provides resources to these other institutions and MD Anderson, of course. Exactly what do you mean by "resources?"

William C. Satterfield, DVM
0:03:49
Our resources primarily are in terms of our animal models and our ability to use these animal

models and to develop translational things that would benefit cancer patients and other people and other types of medical issues that would solve advanced medicine for human beings. The models range from mice through chimpanzees and large animal models. We have been a source of medical expertise, surgical expertise, and more recently, compliance with FDA expertise to translate basic science into things that can actually go into patients and help, either in terms of pain amelioration or pain modification or other types of—. More recently, I think the so-called "fat zapper" that one of the—in the Department of—well, let's see. I'll have to look in cancer medicine. It was in that Cancer Medicine Division. That product has gone through development in both rodents and primates here, and the FDA has given it preliminary approval for clinical trials in humans.

Tacey Ann Rosolowski, PhD
0:05:31
Would you call the Keeling Center a unique institution?

William C. Satterfield, DVM
0:05:36
That's a great question, and I would say that it is probably an extremely unique facility. A lot of hospital-related or institutional-related animal facilities will say that they're unique, but I believe that we have an opportunity, as veterinarians and basic scientists here in Bastrop, in this MD Anderson satellite facility in Bastrop, to advance science in ways that no other facility has the capabilities of doing because of our—we're not just doing service. We're actually working with basic scientists. For example, I worked with the Department of Neurosurgery for a number of years to develop a method of treating neuropathic pain in cancer patients, and the physician who I worked with was a neurosurgeon, Sam Hassenbusch PhD, MD. He and I worked out a model over about a month's time, and without having him come down here and be here physically, I was able to conduct a lot of his research over the next three years remotely, with him being in Houston and us being here in the sheep model, since sheep cannot be used in the medical center for some zoonotic reasons. They won't allow them to be taken there.

Tacey Ann Rosolowski, PhD
0:07:14
What was that word, zoo—?

William C. Satterfield, DVM
0:07:15
Zoonotic.

Tacey Ann Rosolowski, PhD
0:07:17
Zoonotic.

Interview Session:01
Interview Date: July 24, 2012

William C. Satterfield, DVM
0:07:17
Z-O-O-N-O-T-I-C. Sheep have a pathogen called *Coxiella burnetii*. It's also known as "Q fever." It's interesting in that there's no vaccine for it. There's really not a good test for it, but if you're immunosuppressed, it can be highly infective, and it can be fatal, so they don't want that particular animal anywhere around cancer patients. So we do all that work here, which is fine. It's a great model. It's a great substitute for dogs. We don't have to use dogs. We can use the sheep, and actually, the sheep are a better model than the dog.

Tacey Ann Rosolowski, PhD
0:08:03
Oh, really?

William C. Satterfield, DVM
0:08:03
So it works out great.

Tacey Ann Rosolowski, PhD
0:08:04
Why are the sheep a better model than the dogs?

William C. Satterfield, DVM
0:08:06
They're not as expensive. We don't have to do all the socialization stuff that's required for dogs. They can be housed indoors or outdoors. Dogs, [don't] really do that very well within a research setting. [Sheep] don't chew on their surgeries. They don't lick [their surgeries]. There are a lot of other things. We don't have to walk [sheep]. They're just great to work with, and as far as working with them surgically, they're just— I think they're one of the best models that I've ever worked with.

Interview Session:01
Interview Date: July 24, 2012

Chapter 2
A: Overview
Why Animals are Important in Cancer Research: Controversy Over Using Animals

Story Codes
A: Overview
A: Definitions, Explanations, Translations
D: Understanding Cancer, the History of Science, Cancer Research
B: Building/Transforming the Institution
C: Controversies
C: Cancer and Disease
D: Ethics

Tacey Ann Rosolowski, PhD
0:08:40
Interesting. It just occurred to me to ask you for another definition as we're beginning here. I don't know if I—I didn't mention before we started the interview proper that this archive is going to be available not only for people who are specialists in the medical field but also for laypersons, and so I wanted to make sure that there are some definitions of terms. As I was reading your background material, a term that comes up over and over again, and you used it here today, is the "model." I'm wondering if you could define what that means, like the sheep model or the mouse model. When you use that phrase, what does that signify?

William C. Satterfield, DVM
0:09:22
The model, in sort of generic terms, is that any kind of substitute for a human has to be in such a way that it can model that condition in the human, because that's our ultimate goal. Whatever we're doing, whatever research we're looking at—be it prostate cancer—we have to develop a mouse model that has the same kind of characteristics so we can—as the scientists that working with them can develop approaches to either diagnosing, preventing, or treating that particular condition in the "model."

Tacey Ann Rosolowski, PhD
0:10:03
How do you know—?

William C. Satterfield, DVM
0:10:04
Which is separate from humans, so you're not doing this basic type of research in a human, because there are ethical reasons for not doing that. But we can do it in a sheep or we can do it—

look at the pathogenesis of a viral condition or look at the—and put implants in the spinal cord of a sheep and test the analgesic's qualities of various types of analgesics to treat neuropathic pain. Neuropathic pain is pain that can't really be alleviated, and it can occur in a lot of cancer that affects the central nervous system with spinal pain. It can be quite clinically difficult.

Tacey Ann Rosolowski, PhD
0:10:49
How do you know when you have an animal model that approximates what a human being would experience or what a human being's tissue is like? How do you determine that?

William C. Satterfield, DVM
0:10:59
The whole thing about using animals is that all of us, including the whole phyla or the whole—if you look at it from a comparative point of view, all the animals with backbones, including us, have an evolutionary history that is similar. So the way our cells work and the way a mouse cell works are basically the same. Now, there are other things that affect those, obviously, so we have to take all of that in consideration. And this is what the people who are not in favor of animal research say. "You can't compare what happens in a mouse to what kind of thing happens in a human." But if you take it in just the context of what you're looking at, a lot of that can be certainly instructive, and you can get a pretty good idea how it's going to work in humans. And that is one of the reasons in the safeguards of developing drugs. You usually have to use several models to make sure, or several different animals to make sure, that it still is a consistent result.

Tacey Ann Rosolowski, PhD
0:12:08
I see. So, you're ramping up basically to say, "Okay, we know enough—"

William C. Satterfield, DVM
0:12:10
And which is where—

Tacey Ann Rosolowski, PhD
0:12:12
"—that we can do it in humans."

William C. Satterfield, DVM
0:12:12
Exactly, and that's where primates come in, because primates are, in the case of chimpanzees, almost identical to a human genetically as well as physiologically, immunologically, everything else. Rhesus monkey, ninety percent; a mouse, seventy-five percent. Genetically, we can get a lot of similarities in the way—they got their same heart, liver. They may process their food a little

differently in their intestines, but all animals do that, and the same with the way nerves work in terms of the sheep, using spinal treatments. Their nerves operate the same as ours. There is no difference in the way they work.

Tacey Ann Rosolowski, PhD
0:12:59
Okay. We're kind of getting to the second general question I was going to ask, which is why animal research is so important for advancing the understanding of cancer and advancing cancer therapies.

William C. Satterfield, DVM
0:13:10
Cancer is a very complex—it's not a single syndrome. Cancer is as varied as genetics of a human being. There are some commonalities with the way cells mature, and they grow, and they die, and they multiply and so forth. But there are a lot of different types of cancer, and there is no one magic bullet for any one of these. So in looking at colon cancer, for example, we have a model of colon cancer in our rhesus monkeys. They develop colon cancer spontaneously just like people can. And we have a cohort, a little group of animals that are related that there is some genetic—apparently genetic—relationship that is causing this. And we are going to participate with a "Moon Shot" that Dr. DePinho is talking about with this particular model because there may be some questions that we can answer with our rhesus monkeys that develop this. And we also have basic scientists here who can grow some of these in tissue culture. We use tissue culture. That's a very important thing. We do as much "computering" as we can do, but you cannot replicate a complete, living organism with a computer. It just doesn't happen. Nobody has developed that program yet. And when they do, then maybe animals will become obsolete for this, but that's a long ways away.

Personally, I have questions as to how far out that's going to be, because with all the millions of genes that we have within our single cell, each one of these could have a defect in it that you can't predict. You can't program a computer to predict those, so we do need animals. And you can't—some of the stuff that we do, some of the research or some of the projects or the studies we do in chimpanzees, are done specifically with that chimpanzee because there is no other animal except for human beings that those particular studies can be done in. There are specific antibodies that are directed against Crohn's disease, rheumatoid arthritis, and other things that we share with chimpanzees. Those antibody receptors are shared only with us and chimpanzees. If those studies are done in another animal, then the results would be fallacious, and they could be fatal for humans, in fact. There have been instances where that has occurred. So it's just—not every study is done in every animal, but there are— And that's one of the ways that we specialize here at the Keeling Center, is that we are able to help investigators use the right model to get the most reliable answers to help humans.

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Tacey Ann Rosolowski, PhD
0:17:00
The last kind of general question I wanted to ask you before we move on to probably the more chronological part was— First of all, on the outside, I wanted to note that you've been, for many years, responsible for the care of, in particular, the chimpanzees here. And I also read that you're one of the founding members of the National Chimpanzee Research consortium, so that's been a real commitment of yours. And I wanted to note that for some people, the use of research animals, and in particular, primates, is controversial and may be even considered immoral. So I wanted to know what your response is to that and what your personal mission and philosophy is regarding the use of all animals, but particularly the higher primates.

William C. Satterfield, DVM
0:17:51
It's a very controversial area, as you mentioned, and I appreciate the controversy. I understand it, and I have to say and be very blunt about this, unfortunately for society in general, there is a great deal of ignorance regarding science. People are scientifically illiterate for the most part. I love our animals. Every time we lose an animal here from natural causes, it is traumatic. I mean, we take that personally. I take it personally. All of my care staff takes it personally. It's a personal loss to us if we lose—for any reason, natural or otherwise. We have problems with—we treat our chimps for cardiac disease. They have naturally occurring cardiac disease. And we had one die of a sudden cardiac death. It's like a family member, losing a family member or personal pet. It's traumatic.

But on the other hand, it's okay if we inconvenience a few animals for the benefit of mankind. For example, there are over 170 million people worldwide that are infected with hepatitis C. Several million of those reside in this country. Those are people walking around with the virus. There is no treatment for that virus. There are treatments that are emerging now because of the studies that we're able to do with chimpanzees, but chimpanzee is the only other animal that naturally can grow that virus in their system other than man. So we can use that model. They're like us. They walk around with it. In fact, chimps are less affected by it than humans are. Not to say that they are not affected by it, but they are less affected. They don't show any symptoms of it as we would as a human. But the point I was going to make is that of these 170 million or 200 million people—and it's more of an emerging disease outside of this country worldwide than it is in the US because we've done a better job in controlling our blood supplies—however, think of the cost to the families. A person has that for years and years and years. Think of the emotional and the physical and the financial cost to the families, not just the individual, but everybody associated with him and his family or her and her family. And the only treatment for it currently is liver transplant. There are some other treatments, but they are not—you feel as bad on those treatments as you do with the disease. But we're coming up with some actual, possible cures. We've actually been able to cure a chimpanzee with hepatitis C recently. That, to me, was just a huge, huge breakthrough.

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Tacey Ann Rosolowski, PhD
0:21:20
When did that happen?

William C. Satterfield, DVM
0:21:21
That happened about a year and a half ago. And the literature now is starting to be very optimistic about—hepatitis C is now going to be considered a treatable disease as opposed to a non-treatable disease, one that you just endure. So the cost of inconveniencing a few animals versus taking care of—not just the 170 million that are affected, but the millions otherwise that are also affected through the fallout—is just incalculable.

Tacey Ann Rosolowski, PhD
0:22:05
How does that perspective influence just your day-to-day care of the animals? What do you do here to—?

William C. Satterfield, DVM
0:22:17
Day to day? We've got a—

Tacey Ann Rosolowski, PhD
0:22:20
Now I'm thinking about how you—day to day you work with—

William C. Satterfield, DVM
0:22:22
We've got a—we treat each one of them like they're a family member. They've got a medical file. They're scheduled either as animals that are in really good condition. They get a physical once a year. They get ultrasound. They get their hearts checked. They do complete blood work.

Tacey Ann Rosolowski, PhD
0:22:44
So you really treat them like human patients almost.

William C. Satterfield, DVM
0:22:46
And then if they have any other thing going on, they get looked at twice a year. Everybody over a certain age of twenty or so, and even all of our animals are getting echocardiograms. We have a cardiologist look at them. Sometimes they'll get two cardiac exams a year in addition to three

physicals a year, dependent on their category. And we also classify our animals according to the American Heart Association's classification. We have a cardiac group. We're actually doing geriatric medicine on a lot of our animals because we have an aging colony. NIH has had a moratorium on breeding. All of our chimpanzees belong to the government, so we've had a moratorium on breeding basically since 1995, so the colony is throughout getting older.

Tacey Ann Rosolowski, PhD
0:23:45
Why has there been a moratorium?

William C. Satterfield, DVM
0:23:47
Frankly, the controversy over using chimps was not the initial thing. It was more of a concern about what the cost—because they're not inexpensive to keep. It's an expensive model to keep. The NIH maintained these animals as a research resource. And that's what this colony is—a research resource. It's not—they don't get euthanized at the end of a study. All of the other species—smaller primates, rodents and so forth—at the end of the study will likely, in many cases, they'll be sacrificed and all of their organs examined. That doesn't ever happen with chimpanzee. Not ever, unless there's some unplanned accident that has happened, but only once in my career has that happened here. And that particular case prevented that particular product from going into humans and killing a bunch of people. So it would've killed a bunch of people had we not had a—we hated to have it happen here but—

Tacey Ann Rosolowski, PhD
0:25:01
Can you tell me what that product was?

William C. Satterfield, DVM
0:25:04
It was a monoclonal antibody, and it was one that a drug company was developing. And they stopped the development of it because it couldn't go into humans, and that was their ultimate goal was to treat diseases that are caused by individual autoimmune diseases.

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Chapter 3
A: Educational Path
Broad Experience and an Interest in Immunology Creates a Path to MD Anderson

Story Codes
A: Personal Background
A: Professional Path
A: Inspirations to Practice Science/Medicine
A: Influences from People and Life Experiences
A: Joining MD Anderson
A: The Researcher
B: MD Anderson History
B: Philanthropy, Fundraising, Donations, Volunteers

Tacey Ann Rosolowski, PhD
0:25:38
So I wanted to start with those general questions, and now I wanted to move on to some of the more chronologically— I'll kind of catch up on your career. But I wanted to ask, since we've addressed these issues, is there anything else that you wanted to say right now to set the tone for what we're going to talk about these two hours?

William C. Satterfield, DVM
0:25:58
My ending up at MD Anderson was serendipitous. I started out when I left school during the Vietnam era, having to spend some time with the military. As a result of that, I volunteered at the Pittsburgh Zoo and then—

Tacey Ann Rosolowski, PhD
0:26:34
Can you tell me what it was that happened during your military service that made you move to volunteer at the zoo, or go to the zoo?

William C. Satterfield, DVM
0:26:42
The zoo was there, and the director of the zoo actually was a person that I had met while I was interning in Tampa, Florida. And the practitioner that I was interning with there was a consultant for Busch Gardens. So, when he was at—ended up in Pittsburgh, and I ended up there, too, then I reached out to him. And so, I started working on weekends, helping, doing things for him. They had a very limited budget and I had some resources that—medical resources, veterinary resources—I could make available to their children's-zoo-type of animals and could help them

out. And I worked over there. We painted and scraped stuff and did things like that. Then after that, after I left the military, I ended up going to Boston in another zoo, fulltime zoo veterinarian up there. One of the six— I always say I was one of the five or six first fulltime zoo veterinarians that was fully employed in this country at that time. There was New York, San Diego, Washington, DC, and I'm not sure where else, maybe San Diego. Not San Diego, but San Antonio had a fulltime zoo vet. Then I became a fulltime zoo vet in Boston.

Tacey Ann Rosolowski, PhD
0:28:23
Can I just skip back a little bit and catch myself up on kind of what led you to that point? First of all, just for the record, where were you born and when?

William C. Satterfield, DVM
0:28:36
I was born in Lexington, Kentucky, in 1942. I was a war baby.

Tacey Ann Rosolowski, PhD
0:28:46
Is that where you grew up as well?

William C. Satterfield, DVM
0:28:48
And my dad was an engineer, and after being stationed in Key West, Florida, he—while he was down there—his little engineering group brought fresh water to Key West. Before that time, they didn't have fresh water brought in from mainland. They had to— I guess they had to truck it down or somehow or catch rain water. But after he was discharged from the Navy, my parents moved to Tallahassee, Florida, and I grew up in Tallahassee. Went to Florida State University, University of Florida, and attended veterinary college, my veterinary school, at Auburn University.

Tacey Ann Rosolowski, PhD
0:29:35
Why did you decide to become a veterinarian?

William C. Satterfield, DVM
0:29:39
I like the science. That was always an interest of mine. I love biology, and my dear mother loved animals, and that rubbed off on me.

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Tacey Ann Rosolowski, PhD
0:29:57
Did you have animals in the house? I mean, what did she do that created that love—?

William C. Satterfield, DVM
0:30:01
She always had dogs, and she let us bring home stray cats and rabbits. Anything I wanted to bring home, she was good with it. Then we—my brother and I—always had some kind of animal around, and then I became interested in exotics, actually. When I went to Tampa—

Tacey Ann Rosolowski, PhD
0:30:35
So let me just make sure I'm caught up here. So you got your Bachelor of Science in Zoology in '65 at Florida State in Tallahassee. And then you did your DVM at Auburn University in Auburn, Alabama, in '69. Is that correct?

William C. Satterfield, DVM
0:30:53
Correct.

Tacey Ann Rosolowski, PhD
0:30:55
Okay. Why did you choose that particular school?

William C. Satterfield, DVM
0:30:57
I didn't really have any other choices, as a matter of fact, at that particular juncture. There were only—I can't remember now—maybe fifteen or sixteen or so veterinary schools. And we were— Florida had what they called a regional program. They bought—there was no veterinary school in Kentucky, Georgia. I take that back. Georgia had a school, but Florida didn't have one, and Alabama had Auburn, but Mississippi didn't have one, nor did Louisiana. And so each one of those states purchased a number of seats in the program at Auburn to subsidize that program. It was called a regional program because Auburn was a land grant institution.

Tacey Ann Rosolowski, PhD
0:31:49
It seems so strange to me—I mean—in areas where agriculture is so important, not to have a veterinary school. So, what was that about?

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William C. Satterfield, DVM
0:31:56
Very expensive and there—it was specialized. So since then, of course, Florida has a veterinary school. There is a school in Louisiana, a veterinary school. There's one in a number of the other states that were involved in the program. Tennessee was one of our feeder states. They have a school now, too, a school of veterinary medicine. We've got thirty now—thirty schools or so.

Tacey Ann Rosolowski, PhD
0:32:33
Now, you worked with the US Department of Agriculture from '78 to '79 with foreign animal diseases? And I'm not sure if that's foreign animals or foreign diseases.

William C. Satterfield, DVM
0:32:46
In that particular reference that you've got there I was—while I was at the zoo, I attended a foreign animal disease course at the Plum Island facility off of New York, off of Long Island, actually. There was a facility that the Department of Agriculture—a high-containment facility—that they used to study all of the exotic things that are in Africa and other places that would devastate our agricultural economy here were they to be here. And that was what that was in reference to.

Tacey Ann Rosolowski, PhD
0:33:33
Was that part of your interest in what you were calling "exotics"?

William C. Satterfield, DVM
0:33:36
Not really. It was related to that because we had a lot of— At the zoo, we imported animals. We had a lot of animals. Of course, we had a lot of African livestock, so that was why I chose to attend that—was to be part of that program. But it was during that period that I was able to participate, and it was a very unique experience because they only allowed a limited number of folks to be trained there.

Tacey Ann Rosolowski, PhD
0:34:10
What did you get out of it? How was it—?

William C. Satterfield, DVM
0:34:12
What did I get out of it?

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Tacey Ann Rosolowski, PhD
0:34:13
I mean, how was it unique? What was—?

William C. Satterfield, DVM
0:34:15
It's unique in that it's like a high-security area. The only way to get to it was by a ferry boat that the government operated, and the only way to get off there was by that same ferry boat. And it showed up— You had to leave at 8:00, and you had to leave at 5:00. And if you didn't, you stayed right there. You got left behind. But going in and out was— It was a high-security area.

Tacey Ann Rosolowski, PhD
0:34:44
And what kind of things were you looking at there?

William C. Satterfield, DVM
0:34:46
Foot-and-mouth disease, Rinderpest, certain other viral diseases that—African swine fever—those kinds of things that we don't have in our agricultural animals here because they would—it would wreck our economy.

Tacey Ann Rosolowski, PhD
0:35:08
Interesting. I'm just trying to look through kind of the sequence, and you went from '80 to '83, the Tufts New England Medical Center School of Veterinary Medicine. And what was your reason for attending that program?

William C. Satterfield, DVM
0:35:24
I was an adjunct professor there, and I taught there.

Tacey Ann Rosolowski, PhD
0:35:25
Okay, I'm sorry.

William C. Satterfield, DVM
0:35:29
And I taught a course there in zoo animal medicine, so to speak.

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Tacey Ann Rosolowski, PhD
0:35:41
Okay. And then the Department of Defense Wildlife Field Research that you did at Harvard School of Tropical Medicine in Boston, what was that all about?

William C. Satterfield, DVM
0:35:53
We were—they had a study on Lyme disease. They were studying Lyme disease. Lyme disease is originally from Lyme, Connecticut, if you're familiar with that part of the country.

Tacey Ann Rosolowski, PhD
0:36:07
Yes, I am.

William C. Satterfield, DVM
0:36:07
It was sort of where Lyme disease was originally discovered. And there was a—or still is—a very endemic part of the Cape, Cape Cod, that has a high incidence of that Lyme disease there. It's a real problem. So I worked with some basic scientists there who were looking at the transmission of Lyme disease through its life cycle with the mice and the ticks and the deer and the humans. And that was kind of a side thing as part of my zoo experience there.
Tacey Ann Rosolowski, PhD
0:36:50
So I'm trying to get a sense—I mean—through all of these experiences that you went through in that early professional development, when you look back, how did all of that influence your perspective? Because at that point you're about ready to come to MD Anderson, and so how did all of that affect what you brought here as a mission and philosophy?

William C. Satterfield, DVM
0:37:15
Yes. I did a lot of clinical work there with the zoo animals, just normal veterinary care, and had a whole, entire collection of everything from fish to elephants, which included primates—both chimpanzees, gorillas, orangutans, a lot of other African primates—and through doing this field work and other things, it rekindled my interest in basic biology. And we worked on, at the zoo, certain aspects of immunology because that was something that we kept bumping into in trying to care for some of that exotic stock.

And so when I had an opportunity to come here— I was offered a chance to come here to work with chimpanzees and look at this new disease called AIDS. And chimpanzees were at that time the only—they were the closest animal to humans. And the NIH thought that they could perhaps design a vaccine or a treatment or understand AIDS in the same manner that they were able to

develop a hepatitis B vaccine, which they were able to do successfully with the use of chimpanzees. Chimpanzees were also involved in the development of the polio vaccine as well. That's not as well-known either, but chimpanzees were critical in that—used in that as well. So, we didn't know when I came here what the cause of AIDS was. It was likely a virus, but the virus had not been identified. And so we started out doing hepatitis work, because that was the basis and the model again for trying to understand how to use a chimpanzee to figure out what was causing this immunodeficiency disease in humans—acquired immunodeficiency in humans—that people were dying from, as well as this Kaposi's sarcoma that they were developing. And the causative agent had not been identified. Then it was thought to be a human lymphotropic virus called HTLV-3, I believe, at the time. But most of the early work that I did was with hepatitis since I was working with the hepatitis laboratory. Dr. [Robert] Purcell, who had been reluctantly recruited to do HIV work or AIDS work based on his experience with chimpanzees and hepatitis, had been tasked with seeing if he could develop some understanding of what was causing this immunodeficiency syndrome in humans.

Tacey Ann Rosolowski, PhD
0:40:39
So, how did that all work? You were in Boston and so at what point—?

William C. Satterfield, DVM
0:40:44
I was actually— I had actually left Boston, and I had taken a year off.

Tacey Ann Rosolowski, PhD
0:40:50
Why?

William C. Satterfield, DVM
0:40:53
Just to— Why? That's a good question. The truth of the matter is that all zoos have a great deal of politics involved in them, and the politics there just got to be compromising their animal care and I couldn't— I felt like inevitably, I had to leave, so I left. And at the time I felt like I needed to take some time off. I took a year off, and during that year, I met one of the first veterinarians that worked here.

I'd also known Dr. Keeling from my zoo work. I met Dr. Keeling through the zoo organization that I became president of. I had met one of his colleagues here who had worked at Yerkes as well. Both Dr. Keeling and Dr. Riddle, who were the first two veterinarians here—Ken Riddle and Michale Keeling—they both had done work at Yerkes. Then they came to Texas. They wanted to—the National Institutes of Health had all these chimpanzees that they had brought in to various labs for lots of different reasons, had outgrown their laboratory facilities. They needed

a place for them to go. Yerkes couldn't take them or wouldn't take them, so Dr. Keeling and Dr. Riddle designed our compounds and our chimpanzee facilities here.

R. Lee Clark, who had a ranch up here in Bastrop County, called Dr. Keeling down to his ranch one day and said, "Mike, I've got a donor that's got a million dollars. Can you put something together and do a world-class facility?" Basically, I don't know if he said "world class," but a first-class facility. They drew something out, and Dr. Clark said, "Go ahead." So, that's how they started this facility. So then, I came out of that Boston zoo with primate experience. They needed somebody to do primate work, chimpanzee work. There are not a lot of people walking around that had chimpanzee experience. They offered me a position here, and it just happened that I felt like I needed to go back into my professional life, so I accepted the position here.

Tacey Ann Rosolowski, PhD
0:43:27
When you mentioned R. Lee Clark and the million dollars—R. Lee Clark, whenever anyone talks about him, “visionary" is the word that's used. I'm wondering what he saw in the early ‘80s. What were the possibilities for bringing the chimps here? What did he hope would happen with the NIH chimpanzees here in Bastrop, associated with MD Anderson?

William C. Satterfield, DVM
0:43:52
I think he felt like, and everybody felt like, it was an opportunity to get closer ties to National Institutes of Health. It was also an opportunity to have a unique animal model that could assist with understanding human diseases and because of the close similarities. They really didn't get used that much for research purposes in the early years, but they have, over the years, been used for human respiratory syncytial virus. They have been used for hepatitis work. They've been used for monoclonal antibody work. And you'll probably bring this up later on—I did DOD. It wasn't DOD, but it was Homeland Security-type of work with developing a treatment for smallpox.

Tacey Ann Rosolowski, PhD
0:44:52
And when was that? I think I had—

William C. Satterfield, DVM
0:44:52
Smallpox studies were done in the late ‘90s and early 2000. We had a couple of animals that had an experimental history, and we keep extensive records on all of our animals. They had been vaccinated with vaccinia back in the late ‘70s or early ‘80s, and those were the two animals that we felt like we could boost those animals, because there are some parts of the vaccinia virus that are very similar to the smallpox virus. And that's why we get some vaccinia, and that's back in

the old days—me included—had a smallpox vaccine, but it was a vaccinia, these cowpox on us, which is vaccinia.

And that's what eliminated smallpox as a worldwide scourge—people dying right and left with smallpox. When they discovered that these milkmaids didn't get smallpox because of that vaccinia virus, then that became the way of treating or preventing smallpox. Try to understand. We were able to vaccinate our chimpanzees for this vaccinia, and then by using recombinant techniques in the laboratory—this is where the laboratory cell culture comes in—using both the animal as well as the genetics from the animal and doing the recombinant, they were able to develop a monoclonal antibody against the smallpox so that if you were exposed to smallpox, it would be too late to give you a vaccine. But we could treat you with this antibody and prevent the development of the disease. And that's gone into the National Stockpile. The National Stockpile is this theoretical—I guess it's there—they don't talk about it, but it's the Defense Department thing where they maintain agents against any kind of biological threat that could be used for bioterrorism.

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Chapter 4
B: An Institutional Unit
The Keeling Center and Research on HIV and Hepatitis C

Story Codes
B: MD Anderson History
B: MD Anderson Snapshot
A: The Researcher
C: Discovery and Success
C: Collaborations
A: The Researcher
A: Overview
A: Definitions, Explanations, Translations
B: Building/Transforming the Institution

Tacey Ann Rosolowski, PhD
0:47:37
Let's go to that moment when you come here. You're recruited, you come to MD Anderson or you come here to the Keeling Center. What were your goals, and what did you find when you came here? What was the center like?

William C. Satterfield, DVM
0:47:53
There were dirt roads all around this center, and it was the Environmental Science Park. A sign at the end of the road said *Environmental Science Park.* We had our group of chimpanzees that the National Institutes of Health had transferred here for the studies.

Tacey Ann Rosolowski, PhD
0:48:14
How many animals were there?

William C. Satterfield, DVM
0:48:15
They sent fourteen to begin with, and they all came from California. Some of them were former study animals from Jane Goodall, from Stanford University.

Tacey Ann Rosolowski, PhD
0:48:31
How big was it?

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William C. Satterfield, DVM
0:48:32
We had to set up caging. We had to work out biosafety protocols. We had to do a lot of things that have—they've become more sophisticated over the years. It's better caging for the animals, better enrichment for the animals. To begin with, it was pretty, pretty rudimentary. We'd never go back there again, but at the time, it was the best that we knew we could do and still provide biosecurity for people and for the animals and so forth.

Tacey Ann Rosolowski, PhD
0:49:13
What were some of the biosecurity measures that you were using then?

William C. Satterfield, DVM
0:49:18
Separate facilities, separate personnel, clothing, showering—all that stuff was separate. A lot of it was based on my experience from Plum Island where they had biosecurity areas. That was some of the—I incorporated all of the issue—or all of the sort of safeguards that they had there. I felt that those were prudent to go ahead and have here because we didn't know what was—whether it was aerosol or whether it was by blood or feces or spitting. Chimpanzees do all that stuff, so we didn't know what the agent was and how transmissible it was. Turns out it's not very transmissible but still a high pathogen.

Tacey Ann Rosolowski, PhD
0:50:13
So what was the atmosphere like? How many faculty were there? I mean, I really—

William C. Satterfield, DVM
0:50:16
We didn't have a lot of people here. I was the fifth veterinarian on board, and right after I came, the guy that was here doing large animal left to open his own business. His name was Bob Carpenter. He left, and he opened his own business. Dr. Keeling was here. Dr. Ken Riddle was here. Patricia Alford, who was also an Auburn graduate, was here. She was doing her chimp colony. Then I came on as the AIDS guy.

Tacey Ann Rosolowski, PhD
0:50:58
The AIDS guy.

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William C. Satterfield, DVM
0:50:59
Yeah, the AIDS guy, and nobody knew what was causing it. So, I was like, "Oh, great**.** I don't know how long I'm going to be here. I just hope this is not real catchy."

Tacey Ann Rosolowski, PhD
0:51:14
Was it an intellectually vibrant atmosphere? I mean, what was the atmosphere like in terms of collegiality and—?

William C. Satterfield, DVM
0:51:22
It was. We were very collegial. Dr. Keeling, he was a great guy. We kind of worked our way through a lot of issues. We were satellite. People didn't know we were out here for the most part. Houston still doesn't know. Ninety percent of Houston still doesn't know that this facility is here. A lot of them heard of Smithville, but very few of them are aware that this facility is here. Most of them—most of the scientists in Houston, when they understand what is available here, they're anxious to take advantage of it, but it's still a day-to-day thing, trying to educate the folks in Houston. I mean, we were still struggling to get facilities here. One of the things that—some of the money that came in through Dr. Purcell's—the NIAID—we got renovation money. We redid the whole back, bought new caging for all of our animals, and part of that money put a lab onto the existing laboratory for basic scientists so that we could have facilities to have a basic scientist work on campus to help us with viral work, because as veterinarians, we did the medicine and the animal work but the lab work—it was not in our area. So we were able to get basic scientists. I hired a basic scientist. In fact, we had a couple of basic— Then I had basic scientists come from Houston then because of some of the work we're doing, both out of Dr. Arlinghaus's laboratory. I had Jagan Sastry, who is a PhD in immunology, and Pramod Nehete, who is a PhD in immunology. Pramod's still on campus, and Jagan's still part of our faculty, but he is in immunology in Houston. Ralph Arlinghaus [Oral History Interview] has been the chair of the Molecular Pathologies Department for years down there. A great guy. All of this collaboration—it's kind of an incubator for collaboration. That gave me an opportunity to work with NIH. We did over forty protocols with NIH in that study.

Tacey Ann Rosolowski, PhD
0:53:58
And this was the AIDS study?

William C. Satterfield, DVM
0:53:59
The AIDS—well, environmentally, it's hepatitis. We did a few AIDS work. We did some AIDS work. We worked with—but mostly it would end up being hepatitis. They built facilities here—

outdoor chimpanzee long-term housing—but most of the work ended up being hepatitis work. That was because as we became more sophisticated in learning what the virus was—that it was a retrovirus and that it could grow in chimpanzees, but the chimpanzee was not a good model for it because the chimpanzee can control the virus. They don't develop AIDS, but when that virus is combined with a known lymphotropic virus that is in African monkeys and that's put into Indian rhesus monkeys, it acts just like the AIDS virus. That's what they call a "chimeric virus." You're putting it outside of the HIV and then the inside of the simian virus, so we had what they call, "SHIV", S-H-I-V virus. Tons of research has been done on that, tons of work towards vaccines, and tons of work towards treatment. That's been sort of a gold standard with using smaller animals.

Tacey Ann Rosolowski, PhD
0:55:34
I mean, if you'd like to reserve discussion of the details of these studies for a little later that's fine but—

William C. Satterfield, DVM
0:55:42
You can ask—

Tacey Ann Rosolowski, PhD
0:55:42
We could certainly— Yeah, I'd be really interested to kind of know. So you had these forty studies. Were they sequential? I mean, did one lead to another, or were they sort of in groups looking at different aspects of it? How did it work?

William C. Satterfield, DVM
0:55:57
Some of them were sequential. We did—there were six different strains of hepatitis C, and each one of those strains has sub strains in that. But there were clones. They had to be made genetic clones. We tested those clones for infectivity to develop sort of a resource for future testing vaccines. We did a lot of work on hepatitis B. We did a lot of work on hepatitis D, which is another type of hepatitis virus that requires a prior infection or having a helper virus of hepatitis B available. Then we did vaccine studies on hepatitis C. Some of those were not successful. We did a number of those studies.

Tacey Ann Rosolowski, PhD
0:57:05
What were some of the successful studies? You said some weren't but—

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William C. Satterfield, DVM
0:57:10
I worked with a group through NIH that was testing some of the new drugs that are now going to be probably going to clinical trials for treating hepatitis C. Since we have animals that were previously infected with hepatitis C, we treated those animals with these drugs and then they looked at the pharmacodynamics—how long the drug lasted in the bloodstream and then also what happens to the viral load, whether it stays the same, goes up, goes down, whether it mutates to another form of the virus. You might suppress one type. You might have predominantly one form of the virus, and then you put a drug on it that suppresses that form. It can mutate, too. They call it an "escape mutation" to another form of the virus. That happened once. As I mentioned, more recently, we looked at a type of treatment that actually was able to clear the virus. From my perspective, that was a real watershed moment. I think that's been repeated in another facility, too, so we're on the right track there. Now whether that will happen in every case for every human—but I think this holds great promise for a lot of people.

Tacey Ann Rosolowski, PhD
0:58:59
So you started that work pretty much immediately when you got here in 1983, and you had this success with, as you called it, the watershed moment, and that happened about a year and a half ago. I mean, that's a lot of years to get to that point.

William C. Satterfield, DVM
0:59:12
Yes, it is.

Tacey Ann Rosolowski, PhD
0:59:09
That's very slow work, slow going.

William C. Satterfield, DVM
0:59:14
It takes a while. People don't realize it, but a lot of the— We might start a study, and that study would go on because these animals live a long time, and this was a slow, slow pathogenesis of the virus. That study might go on for three or four years. I might be working on the same protocol for three to four years, doing followups on it.

Tacey Ann Rosolowski, PhD
0:59:40
So these are truly in vivo studies on animals that really have long life spans.

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William C. Satterfield, DVM
0:59:45
Our oldest chimpanzee's in his fifties. We've got several in their fifties now. A lot of our animals are in their thirties. We've got a bunch that are— I've got a big list of thirty-year-olds, plus over thirties. Not too many that are in their teens because of the moratorium.

Tacey Ann Rosolowski, PhD
1:00:08
Now with all the other care that you're giving these animals—you talked about the checkups are sometimes more than yearly checkups—is there a way that you control for the care of the animal for other kinds of diseases versus what's happening with hepatitis C and AIDS, which is what you're really looking at?

William C. Satterfield, DVM
1:00:33
Yes. Actually, an animal will not go on a study if it has some disqualifying other medical issues like heart conditions. We've got animals here from New Mexico—I'm sorry—from Arizona. We've got animals here from Arizona that have a history of a fungal disease that's endemic there. They won't do those kinds of studies. They have to be, what we consider to be, naïve. They have to be good candidate animals. They have to be screened. We do a lot of due diligence on all other— And we have to consider the animal's overall health. We will not compromise the health of an animal just to put it on a study. We do care about these guys, and we also care about our families, too.

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Chapter 5
A: Personal Background
A Father Who Beats Cancer

Story Codes
A: Personal Background
A: Inspirations to Practice Science/Medicine
A: Influences from People and Life Experiences
C: Human Stories
C: Patients

William C. Satterfield, DVM
01:01:24
I have to tell you this. When I came here in '83, I was here about four years when my father called me and told me that he had been diagnosed with lymphoma. He had been to a number of physicians in Tallahassee, Florida, a number of oncology physicians. That's cancer doctors. They had written him off, and the last guy I talked to on the phone— I called. I spoke to him. Dad gave me his number, and I called him and spoke to him. He said, "Well, your father's had a good life. I think that he should get his affairs in order." I happened to be in Houston the next day and Dr. [John] Jardine, who was the division chief for Veterinary Medicine at that time, said—I told Dr. Jardine that my dad had been diagnosed. They had written him off, and could I get him into Anderson? Dr. Jardine said, "Bill, come with me." We left that eleventh-floor conference room next to the president's office where we have those first-Thursday morning meetings. Dr. Keeling had sent me to represent him with all of the chairs.

Walked around the corner to an office there, and Dr. Jardine spoke to one of his colleagues and said, "I have a veterinarian here whose dad needs to be seen. He has lymphoma. Can we get him in?" I'm trying to remember the physician's name, but he said, "Just a moment." He picked up the phone, and he called Dr. [Jorge] Romaguera, who is still in lymphoma medicine. He said, "I've got a colleague here who needs to have his dad seen. When can you get him in?" He looked at me, and he said, "Can you have your dad here tonight?" I said, "I will." That was 7:30 in the morning. I called my dad, and I said, "You get on the plane. You and mom get on the plane. I'll meet you at Houston International." I got him there that afternoon and he spent the night at MD Anderson.

In 1995, he was still doing great. He had passed the five years, and his oncology section in Tallahassee said they would never have done what they've done in Houston. They saved his life. I knew then that this was where I needed to be, and I have done everything I could do since I've been here to try to help the quality of life for other people, families in Elgin, the community. Everybody that I know has had some part of their family touched with cancer. I can't honestly

say I don't know anyone— And I've sent lots of people to MD Anderson to be treated. It's an amazing place. We do just a little bit here, but everybody does a little bit, and it ends up being a lot. That's what I've tried to do the whole time I've been here with all of the work with the animals. We do a lot of medical care, just routine stuff, but we get an opportunity to collaborate to help other people cure cancer.

Tacey Ann Rosolowski, PhD
1:05:22
What was the year that your father had that diagnosis?

William C. Satterfield, DVM
1:05:26
It was, like 1987.

Tacey Ann Rosolowski, PhD
1:05:27
Wow, 1987.

William C. Satterfield, DVM
1:05:30
I have some of his medical documentation here, where they sent him stuff.

Tacey Ann Rosolowski, PhD
1:05:43
What is his name?

William C. Satterfield, DVM
1:05:42
It was Henry C. Satterfield. This was in '96, when he got one of his family physicians—said:

"To Whom It May Concern:
H.C. Satterfield is a patient of mine and is being treated for cancer at MD Anderson Cancer Center, Houston, Texas.
Sincerely,
Maurice E. Diehler, MD, Southern Family Medicine."

Dad carried these things around with him. I would take my kids down there, and we'd visit him. They would put the patients up in one of the local motels. Here's Romaguera. He's gone to see Romaguera, different ones, lab medicine.

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Tacey Ann Rosolowski, PhD
1:06:33
What are those documents? Those documents are obviously really important to you. What do they mean to you, to have those letters?

William C. Satterfield, DVM
1:06:47
It gave my dad and my mother years that they wouldn't have had.

Tacey Ann Rosolowski, PhD
1:06:57
Because your dad—

William C. Satterfield, DVM
1:06:57
And they were good years.

Tacey Ann Rosolowski, PhD
1:06:58
Has your dad passed now?

William C. Satterfield, DVM
1:06:59
Yes, he was on the way to have his eyes taken care of and was broadsided at a red light early in the morning, right before daylight.

Tacey Ann Rosolowski, PhD
1:07:16
I'm sorry. That's so—

William C. Satterfield, DVM
1:07:18
That was in '96.

Tacey Ann Rosolowski, PhD
1:07:23
But MD Anderson helped him beat that cancer.

William C. Satterfield, DVM
1:07:26
Oh, yeah. He beat the cancer.

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Tacey Ann Rosolowski, PhD
1:07:31
Did you have quite that sense of mission about your work here before your personal experience with that?

William C. Satterfield, DVM
1:07:36
Not actually. I thought I would be here—when I first came here, I thought I'd be here approximately three or four years and then I'd find something else to do. I didn't know I'd be cut out to do research medicine. But something like that personal— I think a lot of people here at Anderson have some kind of personal connection with their patients and with their family.

Tacey Ann Rosolowski, PhD
1:08:06
It gives you a kind of vocation almost.

William C. Satterfield, DVM
1:08:10
I know that the neurosurgeon I worked with, Sam Hassenbusch—Sam was one of the guys that didn't— I had his book here. Wait a minute—*Physician, Heal Thyself*. Sam Hassenbusch was a neurosurgeon that loved what he did. He loved MD Anderson. I felt like that was one of the— Dr. Purcell and Sam and Mike Miller, who is a plastic surgeon—we did tissue engineering with. Roman Skoracki, who is currently still at— Mike Miller has gone, moved on, become the chair of Plastic Surgery at the Ohio State University School of Medicine. Roman Skoracki is a plastic surgeon, still at Anderson, and some of the other folks. Sam Hassenbusch was— We did just groundbreaking work with trying to solve the issues about neuropathic pain.

Tacey Ann Rosolowski, PhD
1:09:57
Let me—just for the record, this book is called *Physician, Heal Thyself: Brain Cancer: A Surgeon's Journey Through Brain Cancer*. Do you mind if I read what you added to this?

William C. Satterfield, DVM
1:10:05
No, certainly.

Tacey Ann Rosolowski, PhD
1:10:09
"Words cannot express the impact of this news to those of us in Bastrop at the Keeling Center who knew and worked so closely with Sam since 1993 to develop new therapies to alleviate

severe pain in cancer patients. He was in every sense a leader and physician scientist. It was a great shock when he told me that he was a victim of cancer himself. His subsequent bravery and grace in dealing with his disease was an inspiration to so many, including my own family, especially my father-in-law, who passed last spring with a brain tumor."

You've had a lot in your family.

"Our ties were always close to him and his life. We thank God for the time we were given with such special men. My prayers and deepest sympathies are with Sam's family. He will be deeply missed. Bill Satterfield and Family."

That's important people that you work with.

William C. Satterfield, DVM
1:11:03
He was a good dad. Sam rebuilt—in fact, his wife, Rhonda, let him and his son rebuild a car in their dining room. How many people can do that? But that was him. They did stuff like that. And he had an old Charger from, I guess, the ‘70s or something that belonged to his family. He would drive that up here. He rebuilt that and parked it out on the street. It was sitting— so we had fun. We enjoyed what we did, and we were able to do science. I think that's what— I try to tell people, we have such a unique opportunity here. We need to enjoy what we do, have a sense of purpose, and I don't want to end this interview without mentioning this special group of people from Elgin that comprise the Cattlemen for Cancer Research.

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Chapter 6
B: Giving to/Fundraising at MD Anderson
The Cattlemen for Cancer Research—Community Philanthropists

Story Codes
A: Activities Outside Institution
B: Philanthropy, Fundraising, Donations, Volunteers
C: Human Stories
C: This is MD Anderson
A: Personal Background

William C. Satterfield, DVM
01:12:07
We need to enjoy what we do, have a sense of purpose, and I don't want to end this interview without mentioning this special group of people from Elgin that comprise the Cattlemen for Cancer Research.

Tacey Ann Rosolowski, PhD
1:12:08
I was going to ask you about them. Who are they, and how did you get involved with them?

William C. Satterfield, DVM
1:12:11
Dr. Keeling had a—I guess—a moment at some point where he said, "You know, I have a number of people that would like to do something to help us. We are a ranching community. Why don't we have a livestock auction and then donate the proceeds to cancer research, and we'll use the proceeds to develop research programs here and have that as seed money," because we had no other way of developing seed money here to do studies. "We can help our own little faculty be involved in the actual cancer research."

Tacey Ann Rosolowski, PhD
1:13:02
When did this happen? When did he—?

William C. Satterfield, DVM
1:13:04
That he started this? I think—I want to say around '89 or '90. No, I take that back. That's too early. It was probably closer to—

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Tacey Ann Rosolowski, PhD
1:13:16
I can check the dates, but early ‘90s?

William C. Satterfield, DVM
1:13:21
I want to say it was probably around '98—somewhere in that '98 range. They have raised over a million dollars. Every year, they give a percentage of that to MD Anderson's fund to help cancer patients. It was supposed to be from a five-county area around here—Bastrop County and so forth. People that go to Anderson, defray some of their living expenses and costs of getting here because it's so expensive to get treated.

Tacey Ann Rosolowski, PhD
1:14:08
It seems like a really—not only a great altruistic move but also a great move to establish ties between this institution and the community.

William C. Satterfield, DVM
1:14:19
The community—oh, absolutely.

Tacey Ann Rosolowski, PhD
1:14:20
Are there other ties? Because clearly the Cattlemen for Cancer Research must have felt that connection before they were asked to participate in something like this.

William C. Satterfield, DVM
1:14:31
Most of those folks were people that Mike knew. I mean, he was in Little League. His girls all played softball. He was on the board of the bank locally. He was in Kiwanis. He was real active in the community. It wasn't very hard to find a group of committed people. After all, we were one of the largest employers in Bastrop County.

Tacey Ann Rosolowski, PhD
1:15:02
Oh, you are?

William C. Satterfield, DVM
1:15:02
Oh, yeah.

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Tacey Ann Rosolowski, PhD
1:15:04
Oh, I had no idea.

William C. Satterfield, DVM
1:15:03
Outside of the prison over here, which is a federal prison—I don't know if they employ as many folks as we have, but the school districts are the big ones. Outside of those school districts, MD Anderson employs more folks in this county than anybody else. We have about 120 people employed here. Of course, this is a resource. A lot of stuff that we buy locally—I mean—we support the county, and Mike was involved in the FFA program and ranching.

Tacey Ann Rosolowski, PhD
1:15:55
And that's Future Farmers of America?

William C. Satterfield, DVM
1:15:56
Yes, through the school up there—and ranching.

Tacey Ann Rosolowski, PhD
1:16:03
You're talking to a city girl here so—

William C. Satterfield, DVM
1:16:03
He was a rancher, as am I. I'm also a rancher, too.

Tacey Ann Rosolowski, PhD
1:16:07
I didn't know that. And so your ranch is in this county?

William C. Satterfield, DVM
1:16:13
Yes. I've been involved in bringing the Austin Community College to Elgin, as well as several school bond—I've had several school bond issues to improve the local schools. But we've had just tremendous cooperation from this community in sponsoring the Cattlemen for Cancer Research auction. They do a live cattle auction every fall and there's also a live—well, it's a silent auction. People from everywhere donate. You couldn't believe all the things that get donated. I mean, it's hundreds of items.

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Tacey Ann Rosolowski, PhD
1:17:00
It isn't just animals?

William C. Satterfield, DVM
1:17:02
No, it's not just animals. It's all kind— I mean, you should come. You would probably spend a lot of money.

Tacey Ann Rosolowski, PhD
1:17:08
When is it? Every fall?

William C. Satterfield, DVM
1:17:09
It's going to be October 20 this year. It's held in October usually every year. We try to avoid a big University of Texas and Texas A&M football game.

Tacey Ann Rosolowski, PhD
1:17:20
Why is that?

William C. Satterfield, DVM
1:17:21
But they always have a TV in one of the tents so guys can watch it—whatever game happens to be on that particular weekend. They serve a brisket lunch, and drinks are donated. We provide a really nice community event, and then in the spring they have a gala. They have a dance, and they raise money during the dance.

Tacey Ann Rosolowski, PhD
1:17:51
So, it's really become part of the culture of the community for many, many years.

William C. Satterfield, DVM
1:17:52I think it has. We have a good core group and always looking for new folks to participate, but we have an excellent core group of people who have grown up in this area and appreciate what MD Anderson has meant to it.

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Chapter 7
A: The Researcher
The Veterinarian as Research Collaborator

Story Codes
A: The Administrator
B: MD Anderson and Government
A: Overview
A: Definitions, Explanations, Translations
D: Ethics
C: Human Stories

Tacey Ann Rosolowski, PhD
1:18:10
That's wonderful. Can I ask you about your other responsibilities and research activities now? Is that—? Can we do that?

William C. Satterfield, DVM
1:18:25
Sure. We've got a couple of minutes. I'm going to— Probably in five minutes I'm going to have to break for this evening because I've got another conference call that I have to take with a study that we're trying to start. I think Mary Jane had set you up for—

Tacey Ann Rosolowski, PhD
1:18:38
Oh, okay. I had on my calendar, actually, until 4:00, but that's okay.

William C. Satterfield, DVM
1:18:43
Okay. All right.

Tacey Ann Rosolowski, PhD
1:18:44
And then we have another session tomorrow?

William C. Satterfield, DVM
1:18:45
You get me at 3:30. She said 3:30.

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Tacey Ann Rosolowski, PhD
1:18:49
Oh, okay. There was a miscommunication, because I actually didn't communicate directly with her. I was communicating with—

William C. Satterfield, DVM
1:18:55
We'll go to 3:30.

Tacey Ann Rosolowski, PhD
1:18:56
We'll go to 3:30, okay. You may have already answered this question sort of obliquely, but maybe I misunderstood. In 1983 you came here, and it said that you were attending veterinarian. Did that mean for all of the animals or just for the chimpanzees?

William C. Satterfield, DVM
1:19:15
No. Actually that title of attending veterinarian is a position that is mandated by the Department of Agriculture for the Animal Welfare Act.

Tacey Ann Rosolowski, PhD
1:19:34
Can you tell me about that—animal welfare? When did that go into effect?

William C. Satterfield, DVM
1:19:38
The Animal Welfare Act's been around quite a while. I want to say probably in the ‘70s. I'm not sure exactly when, but I know at least when I came here in '83 the Animal Welfare Act had been—was already—but it's been amended several times. Sometime around '86 or something like that, they mandated that they set up Animal Care and Use Committees to review all studies that were going to be done. Part of that was that each facility should have what they call an attending veterinarian that is the person that was responsible to the committee—to report to the committee—anything that's not being done in accordance to their—if it's in violation of the Animal Welfare Act. Everybody self-reports problems, but the attending veterinarian is a person that is a veterinarian, a DVM, but is a liaison between the researchers and the committee.

Tacey Ann Rosolowski, PhD
1:20:52
I'm trying to get a picture of what kind of problems there might be. What sorts of violations would you—?

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William C. Satterfield, DVM
1:20:59
You'd have researchers maybe do surgeries that they weren't approved for. You could have them ordering animals that they didn't have authorization to order. You could have animals die unexpectedly from a study that needed to be reviewed by the committee. There are lots of different items that crop up.

Tacey Ann Rosolowski, PhD
1:21:32
Now when I've talked—

William C. Satterfield, DVM
1:21:35
It's oversight.

Tacey Ann Rosolowski, PhD
1:21:37
Now, when I've spoken to some other individuals who have worked in this oversight role or who have been conducting studies and have worked from the other side with these regulations, some of them have pretty strong opinions about how this kind of regulation actually interferes with research. What's your view of that in the case of these animal use regulations?

William C. Satterfield, DVM
1:22:02
You see me smiling because I deal with that. The investigators seem to think that the IACUC, the Animal Care and Use Committee—that's the I-A-C-U-C—is there to cause problems to them. Actually, I think we solve a lot of their problems because we ask them to clearly think through what they're going to do, to have a purpose, have an endpoint, to have the number of animals that they're going to use, justify it statistically. If they can't do that, then they need to go back and think about it some more. In fact, the government—NIH—requires anybody getting any money from them to have IACUC approval. Also, some of those things that they may be using—chemicals and so forth—also have to be approved by the Institutional Biosafety Committee. We make sure that they get approval by Biosafety, and Biosafety— On the other hand, when they apply for the use of a chemical that the IACUC reviewed, they are reviewed and approve their animal use.

Our primary use is to make sure the animals are treated humanely. That's all we care about. We don't review their science, although if their science is dumb—to use a real lay term—we'll say, "Why are you doing this? It's already been done," or "Justify it." Sometimes you need to repeat studies. There's no question about that, but if this is something that has been done ad infinitum, and they're doing it again, it's like, "Why are you doing that? What do you hope to get out of this

that hasn't already been done?" or "That's not the appropriate use of this animal. There are other animals." A lot of times we'll say, "Consult with this particular individual. They can help you design a better study that costs less and is less costly to animals."

Tacey Ann Rosolowski, PhD
1:24:18
I'm starting to get this sense of your all-facilitator role that you've taken on and a lot of—

William C. Satterfield, DVM
1:24:27
I hope I've been able to do that—facilitate. That's what I try to do. I try to develop teams. That's our goal is to develop teams. I love working with the Skorackis and the Millers and the Hassenbusches. Things that I can do, they can't do. Things that they know and their experience and their training—it helps us do cutting-edge type of science.

Tacey Ann Rosolowski, PhD
1:24:53
Raising the humanity with which everything involved is being treated.

William C. Satterfield, DVM
1:25:00
Right.

Tacey Ann Rosolowski, PhD
1:25:01
We just have a couple minutes left before I know you need to close off, and I wanted to ask you, why do you think these regulations about animal care and safety were instituted when they were? Historically, what was kind of the thinking in the country or in the Zeitgeist, if you were, that was creating that need?

William C. Satterfield, DVM
1:25:26
There are people that can answer that probably better than I but I think there was a general concern that things were not being—that animals were being mistreated. There was one case where there was a head trauma study in Pennsylvania, I believe it was. It didn't look good. Not only that, it probably wasn't good science. It made a lot of national—had a lot of national exposure. People were righteously upset. Part of it— But then the other part— There was another part where they felt like a lot of pets were going into research. I don't know if that ever happened.

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We used to have—back when I first started here—we had random source dogs come in here from Abilene that were turned into the pound. I had dogs that we would actually call Abilene and say, "Are you sure this is a dog—?" "Yeah, somebody turned it in." But we never had a pet dog here. I had thousands of dogs come through here. I don't know. There's a real— Now we have all these no-kill shelters and so forth, but there's always been a problem with pet overpopulation. Having said that, one of the early things that we did, too, is we had a tumor referral program here when I first came, and that was one of the things I was charged with was maintaining what we call Central Services. I was in charge of Central Services, and part of what we did was private individuals or pet owners, if their dog was diagnosed with canine lymphoma, we had some protocols that we were trying out, and we would treat them here at no charge to the owner. We asked for donations, but we couldn't charge them according to state regulations. We treated a lot of animals over a number— I treated a lot of animals for lymphoma over a number of years for the community.

Tacey Ann Rosolowski, PhD
1:27:47
Now, was that also part of—? Were you trying new procedures on those animals or—?

William C. Satterfield, DVM
1:27:54
Not really. We just had protocols, and we worked with Texas A&M and we tried—
There is no cure for canine lymphoma. We were trying to extend the life of these pets that— I had one lady come in with her dog. Her husband said, "This dog is so important to her" because her son—and she had a picture of her son—who was like 10, had just been tragically killed. That was her link to her son. He said, "Whatever you can do, Doc, to prolong this animal's life, we would be most grateful for." I did everything I could do to prolong that animal's life because it meant so much to her because of her attachment to that dog through her boy.

Tacey Ann Rosolowski, PhD
1:28:42
Why did you begin that program of treating canines?

William C. Satterfield, DVM
1:28:43
It was already going on when I came here. They had— That was one of the things that Dr. Jardine and Dr. Keeling had started. They were actually doing it in Houston, too. It was a joint program. We treated them. They treated them down there, and we compared our results to see if we could make any big breakthroughs. We didn't actually make any big breakthroughs. There have been some breakthroughs in the last few years in canine lymphoma, but that's twenty-something years, twenty-nine years. Just like hepatitis and AIDS. Still don't have a cure for AIDS.

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Tacey Ann Rosolowski, PhD
1:29:19
Again, that slow process.

William C. Satterfield, DVM
1:29:23
Takes a lot of little, small nicks here and there to try to understand how to defeat a particular disease.

Tacey Ann Rosolowski, PhD
1:29:34
We're at 3:30, so why don't we stop for today?

William C. Satterfield, DVM
1:29:38
Okay. I'll be able to spend more time—we'll be able to spend more time in the morning, I guess. I want to give you a tour as well.

Tacey Ann Rosolowski, PhD
1:29:42
That will be great. All right. Thank you. It's 3:30, and I'm turning off the recorder.

(**1:29:48** End of Audio Session 1)

William C. Satterfield, DVM

Session 2: July 25, 2012

Chapter 00B
Interview Identifier

Tacey Ann Rosolowski, PhD
0:00:03
Today is July 25. The time is about 8:35, and I'm here in Bastrop at the Michale Keeling Center for my second interview session with Dr. Satterfield. Yesterday we ended up—we had a little bit of a conversation about the clinical care of animals. I wanted today to go on and talk—kind of go through in a more organized way the multiple areas in which you have done research. But first I wanted to make sure that you said everything you wanted to at this point about your role as attending veterinarian. We talked about how that was an FDA-designated title [corrected: title established by Animal Welfare Act], but I just wanted to make sure that you had covered everything you wanted to about that role.

Interview Session: 02
Interview Date: July 25, 2012

Chapter 8
B: An Institutional Unit
The History of 'Good Laboratory Practice' at the Keeling Center

Story Codes
A: Overview
A: Professional Values, Ethics, Purpose
B: Institutional Processes
B: MD Anderson Culture
C: Collaborations
D: Business of Research
B: The Business of MD Anderson

Tacey Ann Rosolowski, PhD
0:00:03+
But first I wanted to make sure that you said everything you wanted to at this point about your role as attending veterinarian. We talked about how that was an FDA-designated title [corrected: title established by Animal Welfare Act], but I just wanted to make sure that you had covered everything you wanted to about that role.

William C. Satterfield, DVM
0:00:54
Sure. Just in general, my work at the center, including this role as attending veterinarian, is really to do whatever I can do to advance human health in the discovery of new treatments based on basic science that we're able to accomplish through working with animal models. And my role is really to make sure that the care of these animals is at the highest standard. The animals are here for us, and so we basically are here for them as well. That carries through to all of the animal care staff.

That's an oversight role of the attending veterinarian, but there is a philosophy and a, I guess, well-expressed intent for anyone who has concerns about the way the care of the animals or any individual animal's situation that they can talk about that, either confidentially—so they're concerned about the way research is being conducted—they can speak to me or someone else in a supervisory capacity, and we'll take that seriously and do due diligence on investigating it. It's another means of—another layer of protecting animal welfare.

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Tacey Ann Rosolowski, PhD
0:02:44
You really see this as an analogy to the protection of human patients who are involved in research studies and see the animals as, really, equivalent in importance.

William C. Satterfield, DVM
0:03:04
Yeah. We have a— There's a poster out here in the hallway that is a picture of a young girl in a hospital bed, and a picture included in that same picture are some little white rats or white mice, and it talks about the unsung heroes that provided the care or the medicines that are making her survive—capable of her survival. There are a lot of behind-the-scenes things that happen before we are able to go to the pharmacy and get products that we have confidence in that will be able to help us. It's a very complicated and long, drawn-out procedure.

You know, they talk about how long it takes for drugs to come to the—get to the pharmacy after they're discovered, and out of every 100 to 200 products that have some potential, maybe one will reach the marketplace. It takes an inordinately long period of time, and you'd think that maybe some of these things ought to get there faster. In some countries they do put a lot—let things go through a lot easier, and then they find out the hard way when they get to humans that there are side effects that weren't disclosed or discovered until they were actually put into use.

I think the FDA—the Federal Drug Administration—has done a really good job. It's a difficult job. We work within this program called the Good Laboratory Practice program. They call it GLP for short, but it's a regulated program under FDA. FDA has a kind of an auditing arm. It's separate from some of their other things, and they come in periodically, and they will audit us in excruciating detail. It's analogous to a very thorough IRS investigation that a lot of people would be familiar with. But they are here for a week or more until they're satisfied that the studies have been done, can be reproducible, and have been done according to all of their regulations, which are extremely detailed.

Tacey Ann Rosolowski, PhD
0:05:44
Now I'm noticing that the— I'm a bit confused about the dates because I think 1978 was when the USDA established the Good Laboratory Practice. Is that—? Is that the guideline here?

William C. Satterfield, DVM
0:05:57
No. That's the Animal Welfare Act.

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Tacey Ann Rosolowski, PhD
0:06:01
Oh, okay.

William C. Satterfield, DVM
0:06:01
That's the Animal Welfare Act. The FDA's been around for quite a while. I can't give you a date for when Congress established the Food and Drug Administration, but it's been around for a long time. The work that we do with animals is actually one of the early stages before it goes into clinical trials. It has to go through some toxicity testing. They need to determine the stability of the drugs, what effects it has on other organs, what kind of toxic—and there are toxicity studies that are conducted.

I guess you could take the example of some kind of common product like Tylenol. You know, Tylenol is a good pain reliever, but taken in excess it can become toxic. So the product that you buy in the pharmacy or in the grocery store is a certain size, and the label recommendations say you can take so much, but if you take more than this, then it can cause problems. All that has to be determined, usually, before it goes into humans.

Tacey Ann Rosolowski, PhD
0:07:24
Now, with the Good Laboratory Practice program, is that—? I guess what I'm trying to get straight in my mind is how the Good Laboratory Practice program is related to the types of testing that you just described, and I think—

William C. Satterfield, DVM
0:07:39
Okay. Here's the deal on that. MD Anderson is—in some sense, it's always been a leader in the area of research as well as clinical medicine for humans, cancer therapy. And one of the reasons people come to MD Anderson is that they have a strong research arm. I don't know the exact number, but there are 600 to 700 basic scientists at MD Anderson and another thousand or so clinicians that are also—a number of those are PhD/MD clinicians that do some basic science work at labs and so forth. There are a number of discoveries that were—or, we call them—the legal department calls it "intellectual property"—that was being discovered by the physician scientists and the basic scientists. And sometime late '80s or early '90s, MD Anderson realized they weren't capitalizing all of the intellectual property that was coming out of this laboratory work and basic science work that was being done at the hospital, and they were having to outsource this. So the bottom line for the institution is that, if we can do the development of these products in house, retain the intellectual property and the royalties within the institution, then that can fuel that engine of development to assist patients. And this is, in fact, what's happened.

What we have done here at this facility with GLP is that we are capable of providing a critical piece of that development through the use of our specialized animal models to satisfy the government to allow these products to go to new investigational drug status and then to clinical trials. So I started working with a group of investigators—I guess you'd call them orthopedic people—looking at artificial bone substitutes in sheep in the early '90s from the med school in Houston. And then we started looking at what we could do to develop GLP products, and we realized that we were in a unique situation here—that we could develop a GLP program because we were self-contained out here. We can meet the government standards for electronic data. It's called Part 11. Without getting into a lot of regulatory stuff, Part 11 just says that everything that you put into any kind of electronic data is secure, it hasn't been altered, there is no way to delete data or to put in data that isn't somehow tied to whoever put it in, and it can be retrieved at a later time. There is some assurance that we can reconstruct the study, in a manner.

Tacey Ann Rosolowski, PhD
0:11:22
What are some other elements of that? I hadn't even thought of that. What are some other things that made Keeling unique because it's contained in that way?

William C. Satterfield, DVM
0:11:33
Well, all of our—we have our own pathology. We have our own pathology—anatomical pathology section. We have our own laboratory data section. All of that stuff that's here is run by folks who are highly qualified and meet the standards for the Federal Drug Administration.

Tacey Ann Rosolowski, PhD
0:12:01
Now, did you set out to intentionally do that?

William C. Satterfield, DVM
0:12:04
No, we did not set out to intentionally do that. We just started doing studies for other folks, and they said, "Well, we'd like to have this done in a compliant"—the word 'compliant'—"manner." We know that you don't have a GLP program here, but can you do it GLP-like?" So we started doing GLP-like, but you can't meet all the federal standards doing GLP-like. You have to do—You either do it, or you don't, or it's not that way.

Tacey Ann Rosolowski, PhD
0:12:39
Right.

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William C. Satterfield, DVM
0:12:40
But there are certain circumstances that the government will take data that is being developed or studies that are being developed for patients that can be used in applications where there is no other alternative. They're terminal patients, and this is something that is allowed in certain circumstances. So we were able to do that.

Tacey Ann Rosolowski, PhD
0:13:02
Now, I have the date of 1999 here. Was that when you shifted from being GLP-like to actually being GLP, or—?

William C. Satterfield, DVM
0:13:14
That's roughly correct. Yeah. We set out on a real determined program with these SOP, Standard Operating Practice—which the FDA wants you to have all this stuff written out, reviewed annually. Everybody has to be trained on it. There's a lot of infrastructure in this. It's an expensive program. People say, "Gee, you know, why are we paying so much? You know—you could do all this stuff without charging us." But we have a quality assurance department. We have a compliance section. Training takes a lot of time. Documentation of every little thing takes forever, and there is a chain of custody on test articles that come in. Temperatures have to be recorded. We have environmental quality monitoring on all of our animal areas. All that has to go into a database that can be recovered later if the FDA wants to look at it.

And sometimes the sponsors want to come in—or if a product, for example, is sold. I mean, it gets into the commercialization. We do a study and then for one company and then another company buys that product, then that second company that has brought the product, they want all that data because they want to see if it's—they want to review it to make sure it's something that they want to invest in. So Anderson has developed a whole section to support this—a compliance section. It's got to be a big legal issue that we have to make sure that we cross our "T's" and dot our "I's" and everything.

There are two types of work. You have discovery work, which doesn't have all of that—when they do pilot studies to prove the principles just to see if things are going to be worth pursuing—and then you get into the GLP arena, and then you do an actual study to demonstrate the efficacy or the toxicity or the safety of a product. Those are done so that they're statistically valid, all of the data has been documented and recorded, and there is a final report that's given to the PI or the sponsor that they can submit to FDA so they can go to the next step, which is getting an investigational new drug application. Then they can apply for clinical trials, and there are 600

clinical trials going on at MD Anderson at any one time, and they have over a thousand that are out there that maybe they're doing or they're going to.

Tacey Ann Rosolowski, PhD
0:16:21
Yeah. I read in some of the literature I reviewed for this interview that you thought that the Good Laboratory Practice program was really connected to translational research. I guess now you're kind of connecting the dots on that, so—

William C. Satterfield, DVM
0:16:37
Oh, yes, absolutely. It is translational. You know, at one point early in my career we could do a study here, and if it looked really promising, they could—we'd call it "bench-to-bedside." But in between the bench and the bedside is the FDA, so it's a lot more complicated.

Tacey Ann Rosolowski, PhD
0:17:02
Now, what was your role with the Good Laboratory Practice program? Did you have—were you involved in creating that, or—?

William C. Satterfield, DVM
0:17:11
Yeah. My role in this actually had to do with doing some of these early studies, which were basically good, scientific type of practices. We did everything scientifically. We may not have done all of the documentation that FDA would have desired to have done, but we tried to do it in a manner that could be re-created. We had a quality assurance—someone monitoring that. We started with that and then Dr. Sastry and I proposed the program to Dr. Keeling, who was the chair here at one time, to develop this as a full-blown program. Dr. Keeling took that idea and ran with it. He took that to the administration at MD Anderson. They developed a business plan for it, and Dr. Mendelsohn endorsed it, and then we started putting some serious institutional money towards it.

Tacey Ann Rosolowski, PhD
0:18:28
Yeah. I was going to ask who was involved, because Dr. Mendelsohn [Oral History Interview] was so interested in growing the in-house resources.

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William C. Satterfield, DVM
0:18:36
He was, and this— Dr. Keeling felt like this was a way that this department could be a vital role—play a vital role—to support research and development at the main campus.

Tacey Ann Rosolowski, PhD
0:18:53
At this, can you give me some—an idea of some numbers in terms of Good Laboratory Practice program here? How has it changed the revenue-generating capacity of this—of Vet Med?

William C. Satterfield, DVM
0:19:08
That's—the study—

Tacey Ann Rosolowski, PhD
0:19:17
Maybe that's not quite the right way to ask the question.

William C. Satterfield, DVM
0:19:17
Yeah, because it—we had the resource here, and in early 2000, I think we probably did six to eight of these studies, and they would run anywhere from— They would produce anywhere from several hundred thousand to over a half million dollars per study. That is the cost. But that was the total cost. Whatever revenue we were able to generate went back into our programs. And we had to be competitive with outside organizations called CROs, Commercial Research Organizations. We had to do cost accounting with that to see if we were competitive, because if a sponsor wants to do a study and they can have it done at a CRO and it costs less than what we can do it for, then why would they come here? But what we wanted to cater to was investigators at Anderson so we could work with them and be able to customize the studies with them—something that a CRO would not be as capable of doing.

Tacey Ann Rosolowski, PhD
0:20:39
So that's where the collaborative piece comes back in again, where, I guess, you're trying to partner this department with MD Anderson to craft—

William C. Satterfield, DVM
0:20:51
Yeah. That's a great way of putting it. Yeah. We definitely wanted to partner with the investigators at Anderson, because that way, whatever resources they have to put into the study,

it stays in Anderson, and we're able to work with them because—many times—well, it's still on many cases—physicians and investigators at Anderson do not appreciate the complexities of doing a GLP study, so we have to really work with them to understand and explain why we have to do things in a certain way.

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Interview Date: July 25, 2012

Chapter 9
A: The Researcher
The Challenges of Collaboration and Proprietary Research

Story Codes
A: The Researcher
B: Devices, Drugs, Procedures
B: Industry Partnerships
D: On Research and Researchers
D: On Pharmaceutical Companies and Industry
C: Evolution of Career
C: Professional Practice
C: The Professional at Work
B: Critical Perspectives on MD Anderson

Tacey Ann Rosolowski, PhD
0:21:31
Can you give me an example that you're particularly pleased with—one of these collaborative relationships that really delighted you in how it went?

William C. Satterfield, DVM
0:21:44
Sure. The work we did with Sam Hassenbusch, the neurosurgeon, working with a commercial company with an implantable drug delivery system that we were able to develop in an alternative to morphine delivery for spinal pain. We were able to develop a drug that was a good alternative that didn't have the side effects that morphine has—long-term morphine therapy has. It turns out that morphine given in the—to the—for spinal pain directly in the spinal cord will cause a small—it will cause a fibroma in the spinal cord and actually will end up being a space-occupying lesion that will cause a severe spinal deficit. So we had to come up with— Dr. Hassenbusch wanted to come up with an alternative to that, and I was able to work with him. We came up with one, and we ended up going to clinical trials with that. That was particularly good. I think he enjoyed that. We had— He presented that at many international meetings for neurosurgery. We were able to help some people with that.

Tacey Ann Rosolowski, PhD
0:23:26
And it sounds like he was right on the same page with you about the need to follow the Good Laboratory Practice—

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William C. Satterfield, DVM
0:23:35
Oh, yeah. He was. He understood that.

Tacey Ann Rosolowski, PhD
0:23:37
Yeah. And I'm sure that helped a lot.

William C. Satterfield, DVM
0:23:41
Yeah. The documentation is—that ends up coming with these things is voluminous. It's mind-boggling.

Tacey Ann Rosolowski, PhD
0:23:52
I wanted to talk about, in more detail, some of the research studies that you've done, and since I had down the name of the drug that you tested with Dr. Hassenbusch's—midazolam?

William C. Satterfield, DVM
0:24:11
Midazolam.

Tacey Ann Rosolowski, PhD
0:24:13
Midalozam. And I'm wondering if you would like to talk about that in a little bit more detail. I'm mean, we've kind of touched on it with this example, but how exactly did you go about doing that study? What was the method for—?

William C. Satterfield, DVM
0:24:30
Well, the method involved using sheep and the pump—the drug pump—is one that is commercial—well, is an instrument that's been approved by the FDA for human use. We got these through— Dr. Hassenbusch acquired these from the company that manufactured them.

Tacey Ann Rosolowski, PhD
0:25:00
And what was the company?

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William C. Satterfield, DVM
0:25:01
I don't think I'm supposed to tell you that because that's proprietary.

Tacey Ann Rosolowski, PhD
0:25:03
Okay.

William C. Satterfield, DVM
0:25:07
That's one of the things that you have to end up doing with this FDA business is you have to be—you know—all these things are proprietary, and—

Tacey Ann Rosolowski, PhD
0:25:16
Normally, I ask that question, "Can you tell me?" but—

William C. Satterfield, DVM
0:25:19
Yeah. I know. I'm sorry, but—

Tacey Ann Rosolowski, PhD
0:25:21
That's all right.

William C. Satterfield, DVM
0:25:21
I try to protect the innocent, you know. And since you brought that up, one of the complications, of course, of doing this is that companies will want us to sign a confidentiality statement. So if we have to do that, it substantially increases the cost of doing business because then there's about three to four months of legal wrangling that occurs between our lawyers and their lawyers. It's just—and so we have an agreement with the companies that we'll protect their—you know—we don't have to disclose that to anyone because it is proprietary and it involves intellectual property. So long story short, try not to talk about whom did what and when.

Tacey Ann Rosolowski, PhD
0:26:23
Sure.

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William C. Satterfield, DVM
0:26:24
And that's a problem for us. And I'll say this—and I don't want to say it because I do proprietary studies—those are not published. A lot of work that I've done is proprietary. I've done dozens and dozens of proprietary studies. Now, if I was doing— In a basic science lab, I would probably have dozens and dozens of publications based on those studies, but because they're proprietary, I don't own them, and I can't publish them even if they're negative. And that's one of the issues that we struggle with is that we'll do something that doesn't work, and probably that would be important to be published because other folks with them would say, "Hey, we're not going to do that because we know— Here's a publication that indicated that it's a negative result." But you rarely see negative results ever published in any, except in major journals. So intellectually, it's important, but as far as being publishable, it's not. As far as working with companies and doing—even within our own institution—doing proprietary studies, those are not published.

Tacey Ann Rosolowski, PhD
0:27:32
Is that a career issue, too?

William C. Satterfield, DVM
0:27:34
It's a severe career issue. It's a big deal. And I struggle with that. I struggled with that throughout my career, and I think other folks are going to be struggling with it, too. And I've tried— When I'm on committees—and I'm on a lot of these research appointment committees, review committees—I counsel the people that I reviewed and say, "You've got to have some type of metric to indicate the effort that you put into developing products and intellectual property for the institution." And they can do it by saying, "I've done this study, which is a proprietary study that—" and put a dollar amount on it. It could be $50,000; it could be $500,000, but that would indicate how much effort went into developing this and writing a final report for it. It's huge. It's a research project in and of itself. I mean, as a PhD, you know what kind of work you have to put into that. These things are tedious. They're unbelievable. And then you can't publish them?

So when you come up for a promotion or a consideration for promotion, they look at your publications and say, "You know, you don't have enough publications." And in an institution like MD Anderson, publications are one of the main criteria that they judge promotion on, in addition to education and research, and then grants and so forth. But these studies are kind of like grants. You get a grant, but you may not be able to publish any—the results of it, because you don't own them.

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Tacey Ann Rosolowski, PhD
0:29:15
Right, which also—

William C. Satterfield, DVM
0:29:15
I don't own them. I'm just— I'm facilitating them; I'm collaborating with them. We're doing some studies now with a couple of collaborators from Children's and from other medical institutions on ways to treat pancreatic cancer. They couldn't do it without us, but we can't publish it because of the proprietary nature of it. Now, when those things get into the marketplace ten years from now, then all that stuff's publishable. But geez—you know—ten years from now?

Tacey Ann Rosolowski, PhD
0:30:00
Yeah, that's a long time to wait for visibility.

William C. Satterfield, DVM
0:30:02
Yeah. Here you are languishing down here in the ranks of the unknown all that time.

Tacey Ann Rosolowski, PhD
0:30:12
Yeah. It's actually surprising to me in an institution like MD Anderson where there are so many people involved in this that there hasn't been some kind of mechanism to recognize the effort.

William C. Satterfield, DVM
0:30:23
It's been a struggle, and as veterinarians, we really are kind of caught in the middle because we're in basic science. Basic science has the folks that review basic scientists for promotion and recognition, have their own labs. They have a particular area of concentration and expertise that they study. As veterinarians, we're working with a lot of different areas, and we don't have our own labs. We don't have our own assistants and so forth, and we're working with other folks to help them develop theirs, so—I mean—we're doing service in one regard, but it's also intellectual contributions to that project—is important to the completion or the success of the project.

Tacey Ann Rosolowski, PhD
0:31:21
What do you think the solution to that problem might be?

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William C. Satterfield, DVM
0:31:24
Well, it means that the people on those tenured and those promotion committees have to be sensitive to the areas, and a lot of them are, really are, because they work with us. And more and more of them have worked with us. I've worked with a lot of them, so when I came up, most of them knew me and said, "Oh, yeah. We know him. We know what he's done. We know his body of work and—". But there has to be a way that we can present that, and that's something I've tried to counsel all of our people here that—because we're in such a unique facility. We're not seen by folks in Houston.

Male Speaker
0:32:06
I just need to grab that laptop.

Tacey Ann Rosolowski, PhD
0:32:09
I'll just pause this for a moment. All right.

[The recorder is paused.]

We're back after just a brief break.

William C. Satterfield, DVM
0:32:13
Okay. Just to go back in history, one of the former VPs, Jim Bowen, tried for years to—I mean—he would come down here and he'd say, "Yeah, I understand that, you know, what kind of work your guys are doing, and we're working to try to get—try to help you out." And then, Fred Becker [Oral History Interview] was aware of what we're doing, but I don't know that it— It didn't reach the level of importance to him that we would like for it to have reached. [Dr. Stephen] Tomasovic [Oral History Interview] was a big help. Actually, when we had— In the last few years, they have come up with this multiple-year appointment for basic scientists that—so that you still sign a contract every year. You still can, you know. It's based on the amount of money you bring in, whether you can stay or go or whatever, but that's been a help. And I think Dr. DePinho is going to be really sensitive to this because of his background in drug development.

Tacey Ann Rosolowski, PhD
0:33:33
Uh-hunh (affirmative). I can imagine.

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William C. Satterfield, DVM
0:33:34
And I've spoken to him about it, and he does appreciate the contributions that we make. And this—going back to the Keeling Center and its uniqueness, why it's different from the veterinary section in Houston—most of what we do here is collaborative as opposed to service. We do service things, and I do a lot of service—care of chimpanzees, care of our large animal models, weekend rotations on clinics, and all of those sorts of things. But most of what I enjoy—really enjoy—doing is working with other clinicians and physicians to develop cutting-edge science, either in discovery or in development of translational products to help cancer patients.

So we have an opportunity here to do a lot more collaborative work than most traditional veterinary support organizations do in medical facilities. We don't have— You know, in Houston they've got hundreds of thousands of mice there, colonies there, that are maintained by PIs doing their own studies. The vets don't get—aren't involved in most of those studies. They're just making sure those studies are being done according to how they're approved. Here, we're involved in the studies.

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Chapter 10
A: The Researcher
A Career of Collaborative Studies from HIV to Tissue Engineering

Story Codes
A: The Researcher
A: Overview
A: Definitions, Explanations, Translations
C: Professional Practice
C: The Professional at Work
C: Collaborations
C: Discovery and Success
D: On Research and Researchers

Tacey Ann Rosolowski, PhD
0:35:16
I wanted to go back as we— Our conversation about all this started with midazolam, and I was wondering what was the problem with the opioids that you were trying to address? You said that when you inject morphine, it would create that—

William C. Satterfield, DVM
0:35:36
You get a little, small, tumor-like formation in the spinal cord—

Tacey Ann Rosolowski, PhD
0:35:42
And so that is—

William C. Satterfield, DVM
0:35:41
—as a result of the presence of the morphine.

Tacey Ann Rosolowski, PhD
0:35:44
And so, that itself causes pain.

William C. Satterfield, DVM
0:35:46
Yeah**.** And that would cause pain and actually, paralysis.

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Tacey Ann Rosolowski, PhD
0:35:50
Oh, wow.

William C. Satterfield, DVM
0:35:51
Could cause paralysis. And, of course, it's inside your spinal cord, so we can't take it out.

Tacey Ann Rosolowski, PhD
0:35:57
Right. Now, why would—? This is a very naïve question, but why would morphine be injected into the spinal column?

William C. Satterfield, DVM
0:36:04
Because that's the only way you can prevent the neuropathic, which is pain that cannot be relieved by taking pills or getting an injection or something.

Tacey Ann Rosolowski, PhD
0:36:15
Okay.

William C. Satterfield, DVM
0:36:16
It's spinal—it's severe spinal pain.

Tacey Ann Rosolowski, PhD
0:36:17
And when was it discovered that these small tumors or lesions would—? How long does it take them to develop?

William C. Satterfield, DVM
0:36:24
Depends on the concentration of morphine, how long it's given. We did studies on that, and with just the morphine delivery and within six weeks, we could get a small, tumor-like formation there. And so with midazolam, you were able to get the—you could deliver that for a longer period of time and without having this lesion formed—

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Tacey Ann Rosolowski, PhD
0:37:03
But it still will—

William C. Satterfield, DVM
0:37:04
—in it. No, we never had a lesion form.

Tacey Ann Rosolowski, PhD
0:37:05
Oh, that's amazing.

William C. Satterfield, DVM
0:37:06
Never had a lesion form with those. And it was also effective— Now, the other problem with the morphine is that you develop tolerance to it. So you start out at a low dose, and then after a while that becomes ineffective in controlling pain, so they increase the dose, and then they have to increase it again, and then the patient requires it to be increased again. And then at that point, you start getting the tumor formation or the lesion formation, and then things go downhill from there.

Tacey Ann Rosolowski, PhD
0:37:40
So when you worked with the model in the sheep, did—? The sheep had some form of cancer that would give them pain, or—?

William C. Satterfield, DVM
0:37:48
No. We were just looking at pain modification in those animals, and we had ways of assessing the analgesia. We had behaviorists involved with watching them, and the standard types of tests that they would do—develop for—specifically for the sheep, to test analgesia in sheep, so we could achieve analgesia and maintain that for however long we wanted to run the study.

Tacey Ann Rosolowski, PhD
0:38:18
So how did you assess that? I assume that you had to create a situation in which the animal was experiencing some kind of pain, and then the pain was relieved.

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William C. Satterfield, DVM
0:38:28
Right. They did that with a water bath with warm water, and they put—sheep would withdraw its foot from the water. And when they would get into an analgesic state, then the warm water didn't bother them, you know. They were—

Tacey Ann Rosolowski, PhD
0:38:45
Oh, interesting. Sheep are touchy creatures.

William C. Satterfield, DVM
0:38:49
Yeah. It was a water-type of testing.

Tacey Ann Rosolowski, PhD
0:38:55
And how does the pump—? Well, maybe this is—

William C. Satterfield, DVM
0:38:58
How's the pump—?

Tacey Ann Rosolowski, PhD
0:38:59
—proprietary.

William C. Satterfield, DVM
0:38:59
No, that's not proprietary.

Tacey Ann Rosolowski, PhD
0:39:00
I was just wondering how the pump works.

William C. Satterfield, DVM
0:39:02
It's got a battery-operated— It's sealed and is good for years.

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Tacey Ann Rosolowski, PhD
0:39:10
So this is actually—? Is it inside the body?

William C. Satterfield, DVM
0:39:13
It's put underneath the skin.

Tacey Ann Rosolowski, PhD
0:39:14
Oh, wow.

William C. Satterfield, DVM
0:39:15
And the delivery system is really quite neat in that it's programmed externally by telemetry in a laptop. And we can control the amount of drug delivered, and it can be refilled. Very small amounts were delivered, so we only had to refill it weekly. And—

Tacey Ann Rosolowski, PhD
0:39:42
So, does—?

William C. Satterfield, DVM
0:39:43
And that's what it— It's given over twenty-four hours. It's given consistently over twenty-four hours.

Tacey Ann Rosolowski, PhD
0:39:49
So it sounds to me like neuropathic pain, as you're describing it, is it a permanent condition that would require—?

William C. Satterfield, DVM
0:39:57
With cancer, yes, it is. And people—one of the advantages of using this particular system is that people can be outpatients. They have this implanted under the skin. The catheter is put into the spinal cord, and the drug is delivered in the spinal fluid constantly. And they can come in weekly and have it either—have the programming changed and have the reservoir refilled on the pump.

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Tacey Ann Rosolowski, PhD
0:40:33
Have the clinical trials on this begun?

William C. Satterfield, DVM
0:40:35
Yes.

Tacey Ann Rosolowski, PhD
0:40:36
Wow.

William C. Satterfield, DVM
0:40:37
Yes. They started several years ago, and I think with—after Dr. Hassenbusch died, he was the lead clinician on that. I'm not sure how that's gone since then. I know that they did recruit patients for that.

Tacey Ann Rosolowski, PhD
0:40:54
That's pretty exciting results, though.

William C. Satterfield, DVM
0:40:56
Well, it was a good study, a good model.

Tacey Ann Rosolowski, PhD
0:41:03
We talked a lot about the hepatitis and the HIV studies yesterday, but I was wondering if there was any more that you wanted to tell me about that in terms of how those went and the results—if we covered that adequately yesterday.

William C. Satterfield, DVM
0:41:23
I think we probably—

Tacey Ann Rosolowski, PhD
0:41:26
We did—

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William C. Satterfield, DVM
0:41:27
Yeah, we did. We talked about that quite a bit.

Tacey Ann Rosolowski, PhD
0:41:29
Okay.

William C. Satterfield, DVM
0:41:30
I don't think there's anything else significant that I can add to that.

Tacey Ann Rosolowski, PhD
0:41:33
Okay.

William C. Satterfield, DVM
0:41:34
I would say that, based on some of the early questions you asked me regarding sensitivity about use of primates in research, is impacting that. I'm not sure that we're going to—that this institution or any institution will be able to use chimpanzees very effectively in the future.

Tacey Ann Rosolowski, PhD
0:41:55
Really?

William C. Satterfield, DVM
0:41:56
And that's going to be a real loss to—that's going to be a loss to science. And it's going to be a loss to medical science, too, because that animal is in a nitch, or niche—however that's properly pronounce— that is not going to be replaced by anything else other than humans.

Tacey Ann Rosolowski, PhD
0:42:19
So just so I understand, it's basically not going to be possible to use chimpanzees—?

William C. Satterfield, DVM
0:42:25
Be very difficult. Well, there are criteria that NIH now has developed that it cannot be done in any other species. It can only be done— It's a study that can't be done in humans, and it's

something that animals pretty much have to acquiesce to or— The bar is we've always kind of accepted those criteria here, but I think having outside people review these with that bar is going to be difficult to—it's going to take a lot of time.

Whoever's in my—filling my position, we spent a lot of time trying to justify it and get those studies approved. And there were folks that were approving them before. It's not that this has never been approved and the studies weren't approved and they weren't reviewed and they weren't vetted. They've always been vetted, and the people who have reviewed them have had a good scientific background. They understood the importance of the science. But people on a committee that have animal extremism as a background, are not going to be very accepting of any kind of animal studies.

Tacey Ann Rosolowski, PhD
0:43:50
What, if any, studies are ongoing right now using the chimpanzees here?

William C. Satterfield, DVM
0:43:57
We have 2 studies right now that are still ongoing. One is involving the treatment of hepatitis C in a single animal that has a chronic case of hepatitis C.

Tacey Ann Rosolowski, PhD
0:44:16
So only one animal is involved.

William C. Satterfield, DVM
0:44:17
Only one animal. We have another study that is involving a monoclonal antibody to treat autoimmune disease, and that can only be done in humans and chimps because only humans and chimps have the receptor sites—that share the same receptor sites—that this monoclonal can address. So this is a safety study.

It's going to be addressed for conditions that currently can't be—there are no pharmaceuticals that can address things like certain types of rheumatoid arthritis, Crohn's disease, and other types of autoimmune diseases. Chimps don't have those diseases, but in this particular study we're doing with the company, it's going to look at the pharmacodynamics and kinetics of the product in these animals as well as some safety aspects, too. We'll be doing a lot of safety things. And there is going to be a safety— There's a safety net for the chimps, too, of any signs of toxicity. Then the study will be stopped. And we're going to be closely monitoring them.

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Tacey Ann Rosolowski, PhD
0:45:33
I noticed here that at some point—you'll have to correct me if I'm wrong with this—but there was a—you had "first in class." I don't know who gave this designation, but there was a "first in class" therapy in Biomedical Research, Development, and Growth to Spur the Acceleration of New Technologies, and that was a pilot program for treatment of human autoimmune diseases. I assume that is what you just described.

William C. Satterfield, DVM
0:45:57
That's exactly what we just described, yes.

Tacey Ann Rosolowski, PhD
0:45:58
Okay. And the "first in class," what did that refer to?
William C. Satterfield, DVM
0:46:02
That refers to a unique product that's first in its class.

Tacey Ann Rosolowski, PhD
0:46:12
Oh, okay.

William C. Satterfield, DVM
0:46:13
Yeah. And it's to address, kind of like—they're almost like orphan products. I don't know if you are familiar with the term "orphan products"—

Tacey Ann Rosolowski, PhD
0:46:25
No.

William C. Satterfield, DVM
0:46:26
—but there are orphan drugs that—they call them orphan drugs because it's not like Tylenol that is sold by the ton. It's products that are very selectively used for a very small percentage of patients for which there is no other treatment for. So that the companies don't really make a lot of money on these, and they're not commercially significant at all because they're basically orphans. They're out there. People that need them can't live without them, but there are not a lot of those people, so they don't make a lot. I mean, it's not something that you're going to pick up as a

pharmaceutical company because it's not going to be a money maker for you, like a statin drug, which is a billion-dollar product—a multibillion dollar product. These are small, small market products.

Tacey Ann Rosolowski, PhD
0:47:26
So it's kind of amazing that the studies are even being done.

William C. Satterfield, DVM
0:47:29
They're done by small companies, and the small companies can do this because they can work with a smaller margin. Large pharmaceutical companies aren't interested because there's not enough margin.

Tacey Ann Rosolowski, PhD
0:47:43
Right. A couple of the other things you've worked on—one of them was ovarian cancer?

William C. Satterfield, DVM
0:47:52
Right.

Tacey Ann Rosolowski, PhD
0:47:54
And can you tell me about that study a bit?

William C. Satterfield, DVM
0:47:55
Yes. I collaborated with two physicians from the Department of Gynecologic Oncology, Dr. Molly Brewer and Michele Follen. They were looking at how you can reduce the risk of ovarian cancer using oral contraceptives. And we did this study in small monkeys. And it went over a several-year period of time where these animals were—and we biopsied the ovaries on them to demonstrate that this could be an effective means of reducing the risk of ovarian cancer.

Tacey Ann Rosolowski, PhD
0:48:51
So that was—? What was the contraceptive that you were using?

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William C. Satterfield, DVM
0:48:54
It was a commercial—just an over-the-counter-type of oral contraceptive.
Tacey Ann Rosolowski, PhD
0:49:01
And it did successfully reduce the risk?

William C. Satterfield, DVM
0:49:03
Yes. They were able to demonstrate that the markers that are seen in ovarian cancer reduced by the use—consistent use—of that product.

Tacey Ann Rosolowski, PhD
0:49:18
And what—? How did you collaborate with them? I mean, obviously you provided the animals, but was this also one of those collaborative roles where—?

William C. Satterfield, DVM
0:49:27
Exactly. Dr. Brewer and I did all of the ovarian biopsies together, and we processed the tissues here, and the slides were made. So we did all of the physical work with this. The intellectual work—some of the intellectual work—our contributions were made by us in terms of selecting an animal that would cycle similar to a human, because some of the primates only cycle once or twice a year, so we had to find some that cycled monthly.

Tacey Ann Rosolowski, PhD
0:50:13
So you're talking about a menstrual cycle here.

William C. Satterfield, DVM
0:50:15
Yeah. An ovarian cycle.

Tacey Ann Rosolowski, PhD
0:50:17
Yeah. Ovarian cycle.

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William C. Satterfield, DVM
0:50:21
An ovarian cycle. Yes. You bet. Because not all primates—and they do menstruate but not— It's difficult to see.

Tacey Ann Rosolowski, PhD
0:50:33
So, it's a—? Okay.

William C. Satterfield, DVM
0:50:34
It's very— Humans hide their cycle whereas a lot of primates—most primates—do not, especially chimpanzees. Chimpanzees are very—you know—they advertise their cycle big time.

Tacey Ann Rosolowski, PhD
0:50:52
Right.

William C. Satterfield, DVM
0:50:55
It causes a lot of problems out there with the boys—with our boys.

Tacey Ann Rosolowski, PhD
0:51:01
Do you separate the males and females?

William C. Satterfield, DVM
0:51:03
No. They're in social groups.

Tacey Ann Rosolowski, PhD
0:51:04
They are?

William C. Satterfield, DVM
0:51:05
They're in social groups. We have a lot of our—most of our animals— Almost all of our chimpanzees are on some type of contraceptive because of the moratorium on breeding, but they're either on implants or oral contraceptives at this point.

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We did have a period of time where all of our animals had IUDs, but because of some of the issues surrounding the maintenance of IUDs, we've gone to implants. It's worked out better. Still expensive. It's about—costs about $700 per implant—just for the implant.

Tacey Ann Rosolowski, PhD
0:51:47
So it's more cost effective, too, to go to oral contraceptives.

William C. Satterfield, DVM
0:51:51
We get two years out of that $700 of contraception.

Tacey Ann Rosolowski, PhD
0:51:54
Right. Gosh. You also worked with the tissue engineering, and I wondered if you would tell me a bit about that?

William C. Satterfield, DVM
0:52:05
That's a great—was a great program, too, first with Dr. Miller, who was the Deputy Chair of Plastics at MD Anderson, and then more recently with Roman Skoracki, who is a faculty member in that department. We developed— Dr. Miller was looking for a way to recreate body parts, as it were, in using these molds that they would make, and we would take—designed a way to take these molds, fill them with cancellous bone, and then put periosteum over the implant, and then attach it back to the body wall. This was done in sheep.

Tacey Ann Rosolowski, PhD
0:53:13
Can you—? I'm sorry just to interrupt you, but now, cancellous bone, what does that mean?

William C. Satterfield, DVM
0:53:18
That's the bone that's around the outside of the—you know—your bone has a center portion and a hard outside portion. The outside portion—we were using ribs, so we were using both, I guess—all parts of the bone to be more accurate. That was crushed to use as a—so we could put it into a mold. Then the mold was attached back to this body wall, and then within—about six weeks later, we would recover that implant and the blood supply that was attached to that implant. Then we could move it to a different portion of the body.

We actually did a study with a sheep, to put a mold in that approximated the mandible of the sheep, removed a section of the sheep's mandible. Took that tissue-engineered implant out along with its artery and vein, and then reattached it in the jaw of the sheep and attached it—the artery and the segment of artery and vein—to another artery and vein that we found up in the throat of the sheep—

Tacey Ann Rosolowski, PhD
0:55:02
That's amazing.

William C. Satterfield, DVM
0:55:03
—to revitalize it.

Tacey Ann Rosolowski, PhD
0:55:04
Wow. And so, the creature had the—

William C. Satterfield, DVM
0:55:07
And then with some bone plates, plated it in place so that it would grow in place there.

Tacey Ann Rosolowski, PhD
0:55:13
So completely rebuilt.

William C. Satterfield, DVM
0:55:15
Rebuilt, yeah. There is a whole body of tissue engineering for all—basically, every part of your body now, and because of problems that—I guess, clinical problems—that were identified in Houston with trying to return to function, the mandible—when that has to be removed, usually from tobacco products—they were trying to find a way to tissue-engineer another mandible.

Tacey Ann Rosolowski, PhD
0:55:53
So has that gone to human trials at this point?

William C. Satterfield, DVM
0:55:57
It's been done in other countries.

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Tacey Ann Rosolowski, PhD
0:55:58
It has been.

William C. Satterfield, DVM
0:55:59
But Dr. Miller moved on to Columbus, Ohio, and we have done—worked on other strategies for enhancing the development of the bone. One of the weaknesses of this is getting good, viable bone out of these molds, and sometimes it works, and sometimes it didn't work so well, so—

Tacey Ann Rosolowski, PhD
0:56:27
Do you know why—what was happening?

William C. Satterfield, DVM
0:56:29
Yes. You have to get growth factors into this, and we worked with different strategies to develop growth factors or to get growth factors injected, to put growth factors in to begin with. So there are a lot of little intricacies that can make this a difficult process.

Tacey Ann Rosolowski, PhD
0:57:01
And what's the—?

William C. Satterfield, DVM
0:57:02
The idea is great. We know what we want to do, but it's just getting it to work because you're working with a living organism. You can't do this. This is one of the things that can't be a computer model. I mean, you can model this with a computer, but getting it to work in real life as opposed to the model are two different things.

Tacey Ann Rosolowski, PhD
0:57:21
And what's the fate of that study right now? Is it—? Are you still involved with that?

William C. Satterfield, DVM
0:57:26
Well, the funding on it was external, and we stopped doing this about three or four years ago, I would say. And some of it has to do—some of the studying participants have had such heavy

clinical responsibilities, we haven't been able to get back to this. It goes back to the pressures that have been put on the institution to develop clinical revenue.

Tacey Ann Rosolowski, PhD
0:58:04
Yeah, this is something I've heard from a number of people that I've been interviewing is the—

William C. Satterfield, DVM
0:58:11
It's hard.

Tacey Ann Rosolowski, PhD
0:58:12
—the challenge of supporting clinicians in their research career.

William C. Satterfield, DVM
0:58:14
And the guys would come down here, Miller and Skoracki, and we would spend a whole day doing surgeries, but they would have to schedule this, basically doing it on their day off, because their clinical schedule was so heavy. And they'd have to make up those clinics. If they took a— do it during a clinic day, they have to make it up somehow. It is unfortunate. But that's— I guess that's the way it is. And that's really my role—was to make it easier for them to do this research work and not impact their clinical production.

Tacey Ann Rosolowski, PhD
0:59:12
How did you do that?

William C. Satterfield, DVM
0:59:14
Well, we did a lot of the surgeries. And everything— All they'd have to do is come down, do some of the things that they wanted to do with it, but all the preps and all the after-care and everything else, we took care of all of that because we tried to make it a turnkey project.

Tacey Ann Rosolowski, PhD
0:59:35
What does that mean?

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William C. Satterfield, DVM
0:59:37
That just means all they have to do is show up. Show up, and we make the rest of it happen.

Tacey Ann Rosolowski, PhD
0:59:46
Wow. Let's see—is there anything I'm missing with your research areas? I don't know if we— I have the smallpox and biodefense. I'm not sure if you—

William C. Satterfield, DVM
0:59:58
We talked about that yesterday.

Tacey Ann Rosolowski, PhD
1:00:00
We talked about that yesterday. Okay. I just wanted to make sure we covered that completely.

William C. Satterfield, DVM
1:00:02
Yep. Let's see if I've got anything else on here.

Tacey Ann Rosolowski, PhD
1:00:16
And I have also the— You mentioned the programs here and also in Houston to treat canine lymphosarcoma. I also have here that you did some work with looking for tumor markers for that. Was that something significant to talk about?

William C. Satterfield, DVM
1:00:35
We looked for those, but we didn't really find any that—just the process of going through that was something that was done with—in collaboration with the people at Smithville, looking at particular markers. One of the other—certain body of work was done with private companies was to try to develop a cartilaginous or cartilage surface—joint surface—replacements, cartilage replacement on the joint surface—particular cartilage replacement, I guess, is the right way to—

Tacey Ann Rosolowski, PhD
1:01:14
And what joints were being looked at, specifically?

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William C. Satterfield, DVM
1:01:17
Knees. And we did that both in sheep and in goats, so—

Tacey Ann Rosolowski, PhD
1:01:23
So how did you go about developing cartilage? How did that happen?

William C. Satterfield, DVM
1:01:30
There was an artificial—the company provided an artificial substance that we put into the knee of those animals and then, six, eight, ten weeks, twelve weeks, sixteen weeks recovered, the—and look and see how that had—see if they could be replaced. They were going to put these little, small holes all over your articular surface and then put these kind of cushioning things in there, and that would go in a person that had worn off all of their cartilage.

Tacey Ann Rosolowski, PhD
1:02:03
So the process would be that you would actually grow the cartilage in the animal and then transplant it into a human, or—?

William C. Satterfield, DVM
1:02:08
No. This was artificial materials.

Tacey Ann Rosolowski, PhD
1:02:10
Oh, it was artificial materials.

William C. Satterfield, DVM
1:02:12
Yeah. It was artificial materials.

Tacey Ann Rosolowski, PhD
1:02:13
Oh, okay. And then it would attach.

William C. Satterfield, DVM
1:02:14
Yeah. It would be incorporated into the bone, into the joint.

Tacey Ann Rosolowski, PhD
1:02:15
What was the—? Is the material proprietary?

William C. Satterfield, DVM
1:02:20
Yeah.

Tacey Ann Rosolowski, PhD
1:02:21
Oh, yeah.

William C. Satterfield, DVM
1:02:21
I don't even know what it was. Yeah, that was proprietary. It's a—you know—a knee replacement's a big deal. There are a lot of artificial knees and artificial hips being put in. This was another way to do that without having to chop off a big chunk of your bone and put a whole joint in there.

Tacey Ann Rosolowski, PhD
1:02:41
Wow. And what was the funding for that particular project like?

William C. Satterfield, DVM
1:02:45
That was private. It was a pharmaceutical company. A large orthopedic company funded that. So—

Tacey Ann Rosolowski, PhD
1:03:08
And just for the recorder, I want to say that Dr. Satterfield has just pulled up a PowerPoint and is kind of going through a summary of different projects he's worked on.

William C. Satterfield, DVM
1:03:18
Yeah. And we— I'm just making sure that we've talked about other—talked about— Well, working with Dr. [Jagannadha] Sastry in the early '90s and Dr. [Pramod] Nehete with a synthetic peptide vaccine for HIV using the rhesus SHIV model, they had these conserved peptides that were found in HIV—all of the different types of HIV—to try to develop a vaccine for that.

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Tacey Ann Rosolowski, PhD
1:03:53
What's a conserved peptide?

William C. Satterfield, DVM
1:03:55
Well, it just means that all of the different strains of HIV all have this same marker on them. So, the theory was that you could incorporate that into a vaccine and vaccinate a person. They would develop antibodies to those markers, and if their T cells saw that—saw those markers—then they would kill the virus. It wasn't that—it's not that simple. So—

Tacey Ann Rosolowski, PhD
1:04:30
So did that—that was not—was that or wasn't that ultimately successful, or was—?

William C. Satterfield, DVM
1:04:37
They're still working on that.

Tacey Ann Rosolowski, PhD
1:04:38
They're still working on it?

William C. Satterfield, DVM
1:04:39
Yeah. They're working at other approaches on that, so—

Tacey Ann Rosolowski, PhD
1:04:41
Was that privately funded as well, or—?

William C. Satterfield, DVM
1:04:43
Well, let's see. They had lots of different sources of funds. Most of those were NIH funds for those. They had NIH grants for those.

Tacey Ann Rosolowski, PhD
1:04:53
Were these—? Was this done on the chimpanzees or were there other animals?

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William C. Satterfield, DVM
1:04:58
The rhesus monkeys.

Tacey Ann Rosolowski, PhD
1:04:58
Rhesus monkeys.

William C. Satterfield, DVM
1:04:59
Yeah, the rhesus model with that HIV simian immunodeficiency virus combination, where they combine those two viruses together. So these were some other selected studies that I worked with that— Did I mention the synthetic bone substitutes using bone marrow to derive stem cells and growth factors, osteochondral repair, implants and platelet-enriched gel in the goal model, development of bone substitutes and critical science defects in sheep, ovarian vascularity and imaging of the sheep ovary with 3D Doppler ultrasound, microdialysis of opioids in the cerebrospinal fluid—a sheep model?

Tacey Ann Rosolowski, PhD
1:05:48
And that was the one with the pump—the—okay.

William C. Satterfield, DVM
1:05:50
That was one—well, actually, that was a microdialysis. That was one looking at—it was Dr. [Mary Jane] Johansen, who was the doctor of pharmacology at MD Anderson. She had a grant to see exactly how opioids—specifically morphine—was metabolized and how much of it showed up in the spinal fluid after it was administered for pain. How much of that stuff ends up in your spinal cord? You don't know, and the only way to do that is we did a dialysis of— Dialysis is extracting that, and these were extremely little. They were the size of a hair—the tubes that we put in to extract the cerebrospinal fluid to get that, to test to see what kind—type of levels of morphine were ending up actually in the spinal fluid.

Tacey Ann Rosolowski, PhD
1:06:47
Now, was her concern also the creation of these small tumors in—?

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William C. Satterfield, DVM
1:06:53
Her concern was just to see how effective parenteral administration of morphine was for spinal pain.

Tacey Ann Rosolowski, PhD
1:07:02
Okay.

William C. Satterfield, DVM
1:07:03
Because you get more and more of it, how much of that actually gets into the—? Because there is that thing called the blood-brain barrier where products don't always get into the brain or into the spinal fluid where it needs to be.

Tacey Ann Rosolowski, PhD
1:07:19
I've interviewed Dr. Stratton Hill with all the pain control issues and remember him talking to me a lot about the tendency to just give more, more, more when actually there may be a better way to administer the drug than orally or—

William C. Satterfield, DVM
1:07:36
Exactly. And that's what Dr. Hassenbusch and Dr. Johansen collaborated with us on this. This is a picture of that—I'm showing a picture of that sheep and with the drawings on the jaw.

Tacey Ann Rosolowski, PhD
1:07:50
Oh, interesting. So that's where the mandible was going to be.

William C. Satterfield, DVM0
1:07:53
That's where the segment was put in there, and plastic surgeons—they like to draw on their patients before they ever pick up a scalpel so they have conceptually a really good idea of what kind of work they're going to do. And this is just sort of a cartoon of a— This is a picture of a guy without—a cartoon guy—without a discernible jaw—and then a publication that was in 2004 about a man chewing again after growing his jawbone back and a picture of the replacement.

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Tacey Ann Rosolowski, PhD
1:08:26
And where was that done? Was that—?

William C. Satterfield, DVM
1:08:28
This was in Germany. It's a German who lost his lower jaw, cut out because of cancer. I saw this in the paper, and I—this is exactly what we were trying to accomplish. So in terms of the Hassenbusch surgeries, this is what the pump looks like, and then this was placed into the spinal cord. This is a—

Tacey Ann Rosolowski, PhD
1:08:51
So it's just really palm-sized. It's quite small.

William C. Satterfield, DVM
1:08:55
It's very—yeah. It's the size of a little, I guess, almost hockey puck—a little smaller than a hockey puck, and then you make an incision up here. The catheter is placed in—underneath the dura, actually inside the spinal cord, and that's the way it's delivered.

These are some of the early GLP studies. This showing a chart of GLP studies, those ranging toxicity of intrathecal gabapentin in sheep, and that was approved for clinical trials. We also did midazolam.

Tacey Ann Rosolowski, PhD
1:09:39
And you said it would be all right if I got a copy of this for the research medical library—the PowerPoint?

William C. Satterfield, DVM
1:09:48
Yeah. Probably.

Tacey Ann Rosolowski, PhD
1:09:50
Okay. Well, you can think about it and let me know.

William C. Satterfield, DVM
1:09:52

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Yeah. That's got some names on here, but I think that would probably be fine. And this is a picture of—showing a picture of the executive board in 2011, of all of the people in the Cattlemen for Cancer Research that was taken at the last auction in 2011.

Tacey Ann Rosolowski, PhD
1:10:13
That's so great.

William C. Satterfield, DVM
1:10:14
And all of— None of these people, except for a few of us— There's a pathologist here; I'm sitting back in the back, but everybody else is—and Dr. [Christian] Abee, of course—but everybody else are local folks from Elgin that participate and help us out. In 2005 Governor Perry officially designated this as the Keeling Center in honor of Dr. Keeling who was the first director and chairman of the department. So, this is kind of what my goals have been—to search for new ways to improve our animal models and to participate in collaborative programs and conduct research, help our staff grow professionally and all of our care staff who are—they are all part of the process—and to promote collegiality. So basically what I've done in my career here is I've held about five academic appointments, been on at least thirty institutional and departmental committees, participate on forty-nine grants contracts, and sponsored projects here. At MD Anderson I had fifty-one publications. I had a number before I came here, and then based on our work, there were like forty-three national and international presentations made on collaborative studies.

Tacey Ann Rosolowski, PhD
1:12:03
I'm aware that—

William C. Satterfield, DVM
1:12:05
So that's kind of a summary.

Tacey Ann Rosolowski, PhD
1:12:05
A summary. We're at about ten of 10:00, and I'm wondering— Is it all right if we run beyond 10:00?

William C. Satterfield, DVM
1:12:15
That would be all right.

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Chapter 11
A: The Administrator
Managing Animals, Research, and Disasters

Story Codes
B: Building/Transforming the Institution
B: Devices, Drugs, Procedures
C: Professional Practice
C: The Professional at Work
C: Human Stories

Tacey Ann Rosolowski, PhD
1:12:15
Okay. Because I had— I wanted to make sure that we did talk in more detail about some of the administrative roles and ways in which you've contributed to the development of the center itself. Would that be okay?

William C. Satterfield, DVM
1:12:33
Sure.

Tacey Ann Rosolowski, PhD
1:12:34
Okay. Now, since 1986 you've been chief of the livestock and land management arm of the Department of Veterinary Sciences, and I really have no idea what that might mean.

William C. Satterfield, DVM
1:12:51
Well, that's just—primarily what that means is that all of the projects involving large animals, which for the most part are sheep and goats, so those have been areas that I've been responsible for.

Tacey Ann Rosolowski, PhD
1:13:12
And what does that involve, exactly?

William C. Satterfield, DVM
1:13:15
Surgery, surgical support, radiology, technician training, technician support, instrumentation—

all of the things that are going to—having a program that we can utilize sheep and goats. In some cases—and there's also a biologics program that we provide blood products to the state laboratory for encephalitis testing—those sorts of things. I don't physically, personally get involved in it. I have technicians that carry out those functions, but if there's a problem with those animals that they need healthcare, then I'm the one that's responsible for doing that.

Tacey Ann Rosolowski, PhD
1:14:10
I see. What about the land management piece of that?

William C. Satterfield, DVM
1:14:14
Land management is kind of a—I have to say, I haven't done anything with that. We've got folks down there that do take care of the pastures, and we contract out hay production here to outside people. That's kind of the way that goes. If there's a problem with it, they come see me. Otherwise, I don't get involved, and I let them kind of do their thing.

Tacey Ann Rosolowski, PhD
1:14:41
Now, one of the main things is your involvement with the chimpanzee biomedical—

William C. Satterfield, DVM
1:14:47
One of the things I did do with land management was I was able to— We had a little chunk of land over here on our—one of our borders—that was about eleven acres that had a—that was privately owned, and the folks that owned it moved to a mobile home and had a power pole set. I had a security and a number of concerns with having someone on our perimeter of our chimpanzee colony that could either cause problems to us or we could be a problem for them, and I was able to convince the system, as well as MD Anderson, that we would acquire— We acquired that land back around 2002 or something like that. So we were able to pick up eleven acres and then so we have—all around us is—we don't have any people abutting us. Because of our primate colonies, we need to have, like I say, secure borders here.

Tacey Ann Rosolowski, PhD
1:16:01
What's the total size of the facility?

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William C. Satterfield, DVM
1:16:05
I think it's right at the 380-some acres, but we only occupy, building-wise— We're only on about fifteen percent of it or so. The rest of it is used for grazing and hay production.

Tacey Ann Rosolowski, PhD
1:16:23
And that's—

William C. Satterfield, DVM
1:16:24
And there's a master plan. There was a master plan developed back in 2004 that—where we are capable—we have a lot of opportunity for growth here.

Tacey Ann Rosolowski, PhD
1:16:37
What are the plans for growth?

William C. Satterfield, DVM
1:16:39
We'll grow as—the plans for growth are going to be according to what the current director wants to do, and that's Dr. Abee. And I'm sure it'll happen, depending on the programs that come. They've applied to some of the cancer—that CPRIT, that legislature provided CPRIT grants. They've applied for CPRIT grants to be a state resource for drug development, and should that be granted or that grant be given a favorable rating, that would increase our—we'd probably have facilities come along with that.

Tacey Ann Rosolowski, PhD
1:17:31
Would you like to tell me more now about your role with the chimpanzees because you said you were part of an internal and external steering committee and then were chief—?

William C. Satterfield, DVM
1:17:38
Yeah, those were—we did— One of the grants we had, we had an external advisory committee. We recruited a number of folks to come in and help us as far as giving us external review of our program, our chimpanzee program. And we also look at that internally as well as on a regular basis.

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Tacey Ann Rosolowski, PhD
1:18:04
Now, it may seem really—I mean—obvious, but just—maybe not. Why are chimpanzees so labor intensive to maintain?

William C. Satterfield, DVM
1:18:17
They are a—It's a great ape. They're intelligent. They have strength—individually, the strength of half a dozen guys. They live in social groups. Because of their intellect, we have a department or we have a section of behavior. We have a PhD behaviorist or PhD psychologist, actually. They have a behaviorist that works out there full-time. All of these animals have their name. They have a complete medical history. We have a complete behavioral profile on each one. We try to construct the groups in a manner that they can all live together harmoniously but chimpanzees are not a harmonious; it's not a harmonious species. They have a constant hierarchal struggle and so we have to— When we take an animal out for a study, then we have to figure out what it's going to—how it's going to impact the group as well as how that individual animal will handle the study.

External advisory committees—they would look at what kind of opportunities—would help us understand what kind of opportunities were available outside of here in order to—that we could capitalize on using the model in a responsible way.

Tacey Ann Rosolowski, PhD
1:20:03
These would be studies that other people would ask you to do.

William C. Satterfield, DVM
1:20:07
Right. It would be either National Institutes of Health, aging—I mean—all of our animals are getting older, so it would be an aging study. We have a couple animals with diabetes, so diabetes-type programs or studies that we could do some basic research in some of those areas. Cardiac—there's a lot of opportunities. There's so much to do and so little time, I guess is the way to put that.

And so the internal advisory committee would kind of review our program—our health programs, our geriatric programs, our husbandry program, facilities, what kind of things we have to do as far as there is always facility work that has to be accomplished with these animals. We've got good facilities, but they are hard on them. And we try to— We constantly try to improve our facilities as well for the animals.

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Tacey Ann Rosolowski, PhD
1:21:18
What kind of improvements have you made in the facilities over here?

William C. Satterfield, DVM
1:21:20
Well, I showed you—the Primadomes have—were designed here and by Dr. Keeling and—

Tacey Ann Rosolowski, PhD
1:21:28
Oh, I didn't realize that.

William C. Satterfield, DVM
1:21:30
Every time one of those is built or sold, then MD Anderson gets some royalty from that.

Tacey Ann Rosolowski, PhD
1:21:38
That's cool. Now what—?

William C. Satterfield, DVM
1:21:39
That's a patented design.

Tacey Ann Rosolowski, PhD
1:21:42
What's the logic of the Primadomes? You know, what's their purpose?

William C. Satterfield, DVM
1:21:44
It's this outdoor exercise facility that we can socially house animals in that they can take advantage of vertical as well as horizontal parts of that. We put structures in them. I'll take you around and we'll see them but— In fact, we probably need to break and go do that pretty soon. But those are—and they're secure. The animals are secure in those, so I won't have to worry about anybody leaving the facilities. The other compounds, they don't have a top on them, but the sides are fourteen feet tall, and they have a—the perimeter has about a thirty to forty-five-degree overhang—three-foot overhang—so that they're not— They can't get out of there, but that wouldn't say they're totally escape-proof.

We've had animals be accidentally released from those in the past, and currently we have a fence around the facility that is non-climbable, so security is pretty, pretty tight out there. We don't want animals out. We did have one animal escape several years ago, and that ended up very tragically. A police officer inserted himself in the capture scene and shot the animal.

Tacey Ann Rosolowski, PhD
1:23:29
That's really unfortunate.

William C. Satterfield, DVM
1:23:32
Yep. That was extremely unfortunate. That was—and it was also unnecessary. Just haven't said that. It was— He felt that—in his defense, he felt that there was an imminent threat to—even out there in the brush—there was an imminent threat to public safety. And so that's what he was acting—that's what he acted on.

Tacey Ann Rosolowski, PhD
1:24:00
And how did you see it?

William C. Satterfield, DVM
1:24:04
We weren't anywhere close to any houses or habitation. We were in a pasture, and this animal was trying to get to the brush to safety, and this guy was asked to—not to get involved. In so doing, he actually endangered a number of employees, including myself, by—because we were in the line of fire when he shot the animal fourteen times.

Tacey Ann Rosolowski, PhD
1:24:38
Wow.

William C. Satterfield, DVM
1:24:39
Fourteen times. And we tried— We brought him over here, and we immediately recovered him, took him to surgery, and couldn't—couldn't do anything. Beyond help.

Tacey Ann Rosolowski, PhD
1:24:54
If the chimpanzee had not been shot, what would've been your process for capturing him?

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William C. Satterfield, DVM
1:25:01
We had a capture team there with tranquilizers.

Tacey Ann Rosolowski, PhD
1:25:04
Oh, okay. Yeah.

William C. Satterfield, DVM
1:25:08
And we would've— We would've tranquilized him within thirty minutes, and we would've had him tranquilized and back in the facility. We've had a couple animals out before, and they want to get back in. They don't like being out. It was a— It affected everybody here. It was a pretty dark, dark period in our history. A big investigation occurred after that, and we had lots of people from Houston come up. Of course, the police were—UTPD [University of Texas Police Department] was heavily involved in it since it involved their people, and it made all the papers. We had lots of news people out here.

Tacey Ann Rosolowski, PhD
1:26:06
And what year was this?

William C. Satterfield, DVM
1:26:08
It was '06—something like '06—'06 or '07, somewhere in there.

Tacey Ann Rosolowski, PhD
1:26:21
Would you mind if I pause the recorder just for a moment?

William C. Satterfield, DVM
1:26:24
Go ahead.

[The recorder is paused.]

Tacey Ann Rosolowski, PhD
1:26:26
Okay. Let me just hit—we're recording again, and Dr. Satterfield is talking about training that he does with the UTPD.

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William C. Satterfield, DVM
1:26:34
Yeah, I don't actually train UTPD people, but our colony manager, and with my encouragement as well as Dr. Abee's encouragement, we work with every UTPD person that comes in. We have a procedure that every new person here gets trained on chimp escapes so that there's expectation of what their role is should a chimpanzee accidentally be released. Ninety percent or ninety-nine percent of the chimpanzee releases are human error. Somebody didn't close a door, didn't put a lock on. We haven't had any problems in the last four or five years, but prior to that, there were some issues, but we have— Going back to what I started out to say was that we have a lot of cooperation from UTPD now since that tragic accident with that animal that had to be, I guess, shot.

Tacey Ann Rosolowski, PhD
1:27:42
Now, despite the fact that the officer in question was not censured in any way, do you think the message got through to the people at UTPD that they needed to change their attitude a bit?

William C. Satterfield, DVM
1:27:57
It did and they have been very receptive to working—for the most part, they have been very receptive. We've got leadership here that we meet with regularly and their role—protect public safety—and our role is really not—they're different worlds. So we're talking to them, and they're talking to us, and so we're able to develop good communications and get a good line of authority, a good line of expectations on what happens in these emergencies. And that's really what we want to understand is what happens in an emergency. If it's a person that's hurt, if it's an animal that escapes, what levels do we—? How do we handle that? We have a whole SOP on escapes.

Tacey Ann Rosolowski, PhD
1:28:51
SOP?

William C. Satterfield, DVM
1:28:52
Standard Operating Procedure for escapes and everybody gets trained on that. Whether we need it or not, we train on it, because it's just like learning CPR. You need to know what your role is and how to do it.

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Chapter 12
A: The Administrator
Protecting Animals, Building Collaborations, Protecting the Institution

Story Codes
A: Overview
A: Definitions, Explanations, Translations
B: MD Anderson and Government
D: Understanding Cancer, the History of Science, Cancer Research
A: The Researcher
A: Career and Accomplishments

Tacey Ann Rosolowski, PhD
1:29:12
I'm aware that it's about ten after 10:00, and I just want to check with you about timing because I do have other things I wanted to cover but I don't want to—

William C. Satterfield, DVM
1:29:19
Let's go ahead and cover those and then we can go. I want you to have a tour, too, so leave time—

Tacey Ann Rosolowski, PhD
1:29:25
Okay. Yeah. I'd love to do that. Did you say what you felt you wanted to about the chimpanzee program? I mean, because I was wondering when you came here and got involved what your goals were with the chimps. I don't know—

William C. Satterfield, DVM
1:29:41
Well, when I first came here, my goals with the chimps was to try to understand the pathogenesis and the origin of human immunodeficiency virus, but that changed over the years to advancing human health and advancing the understanding of the chimpanzees and caring for chimpanzees as well as some of our other primates. But we have a highly specialized team to care for them, and that's really taken on a life of itself in that my role in the medical care of this aging colony has become really paramount.

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Tacey Ann Rosolowski, PhD
1:30:36
Are there other colonies like this elsewhere?

William C. Satterfield, DVM
1:30:39
Yes. There are several other colonies. There are three to four other colonies in this country, and we're unique. We're the only country left in the world that has research chimpanzees. All the other countries have hypocritically, I have to say, advisedly have decided that they don't want to do primate research, but they outsource it to the United States. So they have given themselves a clean bill of health politically that they don't do primate research, but they need it. Human health needs it. So we have people from Denmark, Italy, other countries, numerous countries, South Korea, other places that come to us and these other facilities to have studies done.

Tacey Ann Rosolowski, PhD
1:31:38
Interesting.

William C. Satterfield, DVM
1:31:40
San Antonio has a colony. New Iberia—the University of Louisiana at New Iberia—has a colony. There is a colony at Yerkes, of course. Those are the last remaining research colonies, and the animal rights—animal extremists—are going after— They're not animal rights people. They're animal extremists. They're going after all of these to see if they can take all of these chimpanzees out of research, move them to sanctuaries where they will have poor health care, a reduced health care. But because the government owns these animals, they'll continue to receive government subsidies to care for the animals, but they won't have facilities. They'll have to build facilities. There's a bill before Congress right now that's called the Chimpanzee Health Care Savings thing. And there's no savings in it at all. That's a misnomer.

Tacey Ann Rosolowski, PhD
1:32:52
Have you had any issues with extremists interacting—?

William C. Satterfield, DVM
1:32:57
Yeah, they harass us through—I say they harass us through trying to data mine. They ask for thousands and thousands of pages of animal healthcare records. And they're obviously looking for anything that they can use to criticize our care of the animals. But as far as what we are able to do with—what we have done with chimpanzees in captivity, we've done a lot with it, and as a

matter of fact, most of the enrichment and care of animals that is being incorporated into the sanctuaries was developed in the research facilities. They just basically copied us in almost every aspect of care. Some that haven't need to because there are a lot of places that are not—they're not inspected. Nobody knows what goes on there. They're behind closed doors. They say research is always behind closed doors. We're pretty open. Those places are the ones behind closed doors. They're not open to the public. They're not open to inspection. Nobody looks at them.

Tacey Ann Rosolowski, PhD
1:34:27
Is there anything that you wish you had achieved working with the chimps and their—?

William C. Satterfield, DVM
1:34:35
I would've liked to have achieved a vaccine for hepatitis C, a preventive vaccine, a prophylactic vaccine for hepatitis C. I would like to have been able to demonstrate an effective AIDS vaccine. I would've hoped that we would've had one by now, but we don't. Those are things that I would've liked to have done. I would have liked to have been able to come up with a better means of developing bone implants. Otologists are—tissue-engineered bone. I think those are achievable goals. It's just that I don't have enough time.

Tacey Ann Rosolowski, PhD
1:35:29
When are you retiring?
William C. Satterfield, DVM
1:35:31
At the end of August.

Tacey Ann Rosolowski, PhD
1:35:32
Wow.

William C. Satterfield, DVM
1:35:33
Yes. This month. I'm in my twenty-ninth year, so—

Tacey Ann Rosolowski, PhD
1:35:38
It's time.

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William C. Satterfield, DVM
1:35:39
I've been here long enough. There are a lot of bright people coming up to take my place, so I'm sure that there will be a lot of neat things happening in the future and hopefully— One of the things I would like to have seen is that the National Institutes of Health would've seen the value in keeping a more viable colony of chimpanzees for a research resource. I think it's been very short-sighted that they haven't done that.

The animals, great apes in general—the gorillas, orangutans, chimpanzee in the wild have been under a tremendous amount of ecological pressure from habitat destruction, bush meat, and just diseases introduced from indigenous people and tourists that have taken a real toll on their populations. There might not even be wild populations within a couple of generations left in the wild. And so these animals represent a lot of—well, they're just irreplaceable, and the fact that we're not maintaining these populations as viable populations is just, in my view, in my opinion, extremely short-sighted.

Tacey Ann Rosolowski, PhD
1:37:05
And you think they're caving to political pressure, basically?

William C. Satterfield, DVM
1:37:08
Absolutely. Absolutely. NIH is influenced by Congress, and Congress is influenced by these—all of these people who I've described as scientifically illiterate who care for these animals, but they don't care for them enough to see the value in maintaining them. Yeah, we use a few of them for pretty safe studies, to get pretty valuable information, but it's not— We're not abusing these animals at all.

Tacey Ann Rosolowski, PhD
1:37:48
Would you like to tell me about your role with the Institutional Animal Care and Use Committee?

William C. Satterfield, DVM
1:37:56
Briefly, that is mandated by the Animal Welfare Act, and I came on that committee after Dr. Keeling had been on it for a little bit back in the '90s, and I chaired that committee. Mary Jane was one of my excellent members of that committee. I really appreciated—got to work with her. It gave me insights into the research that was going on at Anderson.

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Tacey Ann Rosolowski, PhD
1:38:26
And this is Mary Jane Schier?

William C. Satterfield, DVM
1:38:28
Mary Jane Schier, yep. And we worked with a lot of PIs, and it's an important committee. I know that a lot of people feel like it doesn't really help them a lot, but it does protect the institution.

Tacey Ann Rosolowski, PhD
1:38:48
Is there anything you learned from working on that committee that—because it was maybe in a different relationship—?

William C. Satterfield, DVM
1:38:58
Well, I learned about a lot of really good scientists that are at MD Anderson, and I developed a lot of collaborations, kind of, through that committee, seeing what kind of work was going on. So being out here in Bastrop, 150 miles removed from the main institution, it was very beneficial for us to be there.

Now lately I have to say that when they went through this financial problem a couple years ago, they told us we didn't have any support for travel down there anymore, so we've been attending by teleconference. It does remove us a little bit from that committee and the interaction of the other members of the committee, so I think that was probably a cost savings that we can do a lot of things remotely and so forth, but there is a cost to that, too, from our perspective. From my perspective, there's a cost to that.

Tacey Ann Rosolowski, PhD
1:40:09
Yep, breaking up networks.

William C. Satterfield, DVM
1:40:09
Yeah. It does break up the networks. It really limits the ability to develop networks, and that's a great way to put that.

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Tacey Ann Rosolowski, PhD
1:40:17
What about your involvement in the Pharmaceutical Development Center Steering Committee? And I think you've been involved with that since 2007? Is that correct?

William C. Satterfield, DVM
1:40:29
Actually, I went on that committee back in 2003.

Tacey Ann Rosolowski, PhD
1:40:36
Oh, okay.

William C. Satterfield, DVM
1:40:39
But that was one of the committees—the Pharmaceutical Development Center worked with investigators to develop intellectual property and we tried to— Being a member of that committee, we worked with the folks in that center to—Mary Jane Johansen and Tim Madden, who were the principals in the Pharmaceutical Development Center—to try to facilitate the translational medicine. That's all I did on that.

Tacey Ann Rosolowski, PhD
1:41:27
Okay.

William C. Satterfield, DVM
1:41:27
I was a member and I tried to help them with that, so—
Tacey Ann Rosolowski, PhD
1:41:33
Now, you had mentioned some other roles that you served. You said you also worked as a controlled drug officer. What does that mean?

William C. Satterfield, DVM
1:41:44
That is a DEA—the Drug Enforcement Agency—role because we use lots of drugs up here that are controlled by the Department of Public Safety in Texas as well as the department of narcotics or DEA—Drug Enforcement Agency. And we have to inventory— I have a license in Texas. I have to— As the controlled drug officer, then I'm responsible for everything that comes in here, how it's used, how it's disposed of, recording of it, and then DEA will audit us on that. And we

have to have a complete record of everything because of potential for diversion. And we have had a couple of—a couple of times we had some diversion occur or attempted diversion occur, so—

Tacey Ann Rosolowski, PhD
1:42:51
Really?

William C. Satterfield, DVM
1:42:51
It's a problem in hospitals, and it's a problem in veterinary organizations as well.

Tacey Ann Rosolowski, PhD
1:42:56
Wow. But you said it was averted, so you caught it?

William C. Satterfield, DVM
1:42:59
For the most part, yeah. We caught it. We had one person try to order stuff from Houston and then catch the truck when it came here, so we stopped that. We were able to find out about that and stop it. That was quite a few years ago, in case DEA is listening.

Tacey Ann Rosolowski, PhD
1:43:21
So you're a detective in addition to being everything else.
William C. Satterfield, DVM
1:43:24
Geez.

Tacey Ann Rosolowski, PhD
1:43:29
What about— I notice that fairly recently—I'm not sure—you have a role in the Freedom of Information Act and the Texas Public Information Act, and you work with MD Anderson Legal. What is that about?

William C. Satterfield, DVM
1:43:40
Yeah, and I alluded to that earlier. The animal extremists are trying to data mine us by sending these letters to request everything that we've ever done since the beginning of time. And our legal department—Laurel Hyle is the lawyer at Anderson that I've worked with, collaborated

with—has to file appeals through the Texas Attorney General's office, and if they do it through NIH, then we have to work with NIH FOA office, the Freedom of Information Act. The theory behind, or the rationale behind, the Public Information Act in Texas and the Freedom of Information Act nationally is so that people can find out what their government's doing. Animal extremists are not trying to find out what we are doing. They just want to try to be—obstruct any kind of work with animals. They're trying to be obstructionists. In some cases, they probably use it for fundraising as well.

Tacey Ann Rosolowski, PhD
1:44:58
Your role in this was—was largely because—

William C. Satterfield, DVM
1:45:01
Yeah. My role in it is to review everything that we're asked to release for proprietary information, for anything that we can legally protect. My role is to try to protect this department and this institution as much as possible from the people who do not mean us well at all.

Tacey Ann Rosolowski, PhD
1:45:29
Your role was established in this way largely in response to the extremists, not for—?

William C. Satterfield, DVM
1:45:36
Yes.

Tacey Ann Rosolowski, PhD
1:45:37
Okay. That's—

William C. Satterfield, DVM
1:45:37
Oh, yeah. Absolutely.

Tacey Ann Rosolowski, PhD
1:45:38
Wow. That's really something. Are there any other roles that you served in in an administrative capacity that you'd like to tell me about—things that you had special goals for—?

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William C. Satterfield, DVM
1:45:52
Well, I served as the deputy director with—under Dr. Keeling, and so when he was— I represented the department, and I represented him any time he couldn't represent the department. And then following his tragic death in '03, I became the ad interim chair and was a candidate for chair. I guess I was thankful that Dr. Abee was successful in becoming the chair because I wanted— After being the deputy chair for two years, I missed being in the clinics. I missed being able to do collaborative work with the investigators and doing all of the administrative work that it required of the administrator of this department. I mean, it was interesting, and it was challenging, but it just wasn't the medical work and the science work that I had enjoyed doing previously. At this point in my life, I've done about everything that I could do here at this time, and I think I've accomplished my goals far more than I thought I would when I first came.

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Chapter 13
A: A View on Career and Accomplishments
Bonds with Animals and with Collaborators who Insured a Good Career

Story Codes
A: Personal Background
A: Career and Accomplishments
C: Faith, Values, Beliefs
C: Collaborations

Tacey Ann Rosolowski, PhD
1:47:20
What are the things that really stand out in your mind that give you a sense of satisfaction as you look back?

William C. Satterfield, DVM
1:47:27
As I look back, I don't know—there's a whole body of work, and when I go over it and I look at all of the files that I have, the studies that I've done with different people, I think working with all of the collaborators that I've been able to work with, that has probably been the greatest satisfaction. We've had a good time doing their studies. We've been able to accomplish some things. We've been able to help—I feel like it made some contributions to cancer medicine, and I made a career.

Tacey Ann Rosolowski, PhD
1:48:12
What do you hope will be carried on—things that you feel you've instituted that you hope will be carried on by other people who join Keeling?

William C. Satterfield, DVM
1:48:25
My hope is that we'll continue to do our research here, and my hope is that the faculty here will continue to develop collaborative relationships with Anderson physicians and scientists and that we'll continue with the program. That would be my hope. We'll see what they do, you know? My hope would be that we will have a viable chimpanzee colony at some point. We'll see what happens with that.

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Tacey Ann Rosolowski, PhD
1:49:01
What do you plan to do after you retire?

William C. Satterfield, DVM
1:49:04
My plans after retirement are not set in stone.

Tacey Ann Rosolowski, PhD
1:49:10
Yeah. Is that a good thing?

William C. Satterfield, DVM
1:49:11
I think that's a good thing. I'll make it up as I go. I'm open to opportunities.

Tacey Ann Rosolowski, PhD
1:49:18
Was there anything in particular that inspired you, as you look back—? I mean, with your focus on collaboration and your desire to do basic research, was there something that inspired you in that direction?

William C. Satterfield, DVM
1:49:31
Yes, actually, I had a biology teacher in high school that was—we had a really good class. In fact, it was so good that she had a second year of Advanced Biology, and I took that as well, and that really—it really inspired me to have an interest in science.

Tacey Ann Rosolowski, PhD
1:50:06
I don't know why—I asked this question of many of the people I talk to—

William C. Satterfield, DVM
1:50:11
Her name was Mrs. Lowry, by the way.

Tacey Ann Rosolowski, PhD
1:50:13
Mrs. Lowry.

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William C. Satterfield, DVM
1:50:14
Mrs. Lowry.

Tacey Ann Rosolowski, PhD
1:50:14
I should've known you would remember someone who was that important. That's cool. I'm wondering if you have any kind of—you know—if religion or spirituality is important to you and if you feel that there's a dimension of spirituality in your connection with these animals that you work with.

William C. Satterfield, DVM
1:50:33
Absolutely.

Tacey Ann Rosolowski, PhD
1:50:34
How so? Tell me what that's about.

William C. Satterfield, DVM
1:50:36
Well, I don't know about spirituality, but there is a connection and it is—I don't know. You know, we talk in veterinary medicine about the human-animal bond and all of our care staff regardless—and I talk to them and they have a personal connection with all of their animals that they take care of, and they have little pet names for them. The animals—one of the guys in the back talked about this macaque that he had a name for it—called Trooper. And he said Trooper would put his little hand out and want to hold Matt's finger or stuff like that. And the chimpanzees, they know them, and some of the animals, basically they communicate with the care staff. They talk to them, and they have relationships with them. I don't see them except as when they need medical care or when we have to do a procedure with them. I don't have the same relationship with them. They see me, and they're not pretty happy. They're not very happy about that because—you know—it's like when you're a kid and you go to the pediatrician. That's not your best friend. You're going to get a shot. You don't like that, and that's kind of the way they feel about me.

Tacey Ann Rosolowski, PhD
1:51:59
But you feel the connection to them, though.

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William C. Satterfield, DVM
1:52:00
Oh, yeah. I mean, I know a lot of their quirks and a lot of their habits, and like I was mentioning to you yesterday, it's a personal loss when we lose one, for whatever reason. And it's usually some kind of natural cause. They're dying of old age, and it's hard. And I have to put some to sleep. It's hard. You know, it affects me.

We requested the services of the grief counseling in from Houston after this animal was shot, and we had that guy come up here several times. That really upset a lot of our staff. They didn't know how to deal with that. And that's good. I mean, they care about these guys. That's the level of care that's given. They help us, and we care for them. It's a two-way deal.

Tacey Ann Rosolowski, PhD
1:53:05
Is there anything else that you feel I haven't asked that I should have or that you would like to say at this point? Anything you'd like to add?

William C. Satterfield, DVM
1:53:15
I just want to say—and this is something that I've said before—I'm really not any different from any of the other scientists that came here to work on cancer. I just do it on a daily basis, and it's probably not as visible as other people, but that's what we do.

Tacey Ann Rosolowski, PhD
1:53:39
Well, I want to thank you very much for—

William C. Satterfield, DVM
1:53:40
You're quite welcome.

Tacey Ann Rosolowski, PhD
1:53:41
—talking with me this morning. It's really interesting.

William C. Satterfield, DVM
1:53:43
We can go take a tour.

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Tacey Ann Rosolowski, PhD
1:53:44
Sounds great. I'm turning off the recorder at 10:37.

(**1:53:52** End of Audio Session 2)