

# **Louise Connally Strong, M.D.**

Interview #22

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# Louise Connally Strong, M.D.

Interview #22

## Interview Profile

### Interview Information:

Two interview sessions: 8 August 2012, 10 August 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:

Louise Connally Strong (b. 1944, San Antonio, Texas) came to MD Anderson in 1972 as a Research Associate in the Graduate School of Biomedical Sciences. She is a full professor and Chief of the Section of Clinical Cancer Genetics in the Department of Genetics with joint positions in the Graduate School of Biomedical Sciences, in MD Anderson's Department of Pediatrics/Biology and in Cancer Genetics in Breast Medical Oncology.

Dr. Strong has conducted longitudinal studies of inherited genetics patterns of neuroblastoma, aniridia, and Wilm's tumor. She is best known for her her discovery of the p53 tumor suppressor genes and its link to Li-Fraumeni syndrome.

She has served ad interim Co-Director for Human Cancer Genetics Program Clinical Cancer Genetics, as Deputy Department Chair, Department of Experimental Pediatrics in the Division of Pediatrics, and as Director for Basic Research, Division of Pediatrics. Outside the institution, she served on NCI Data Evaluation Human Risk Assessment Project and President of American Association for Cancer Research ('96 – '97). She was appointed by President Ronald Reagan to two terms on National Cancer Advisory Board.

### Major Topics Covered:

Personal and educational background

Overview and history of oncology genetics in the sixties and seventies

Working with Alfred Knudson

Research: longitudinal studies of inherited genetics patterns of neuroblastoma, aniridia, and Wilm's tumor; discovery of the p53 tumor suppressor genes and link to Li-Fraumeni syndrome, survivorship

Women at MD Anderson

MD Anderson's cancer screening program

Ethics and genetic testing

MD Anderson growth and cultural change

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

**Research Medical Library: Historical Resources Center**

Original Interview Profile #22: Louise Connally Strong, M.D.

Submitted by: Tacey A. Rosolowski, Ph.D.

Date Revised: 11 June 2014

This two-session interview was conducted with Dr. Louise Connally Strong (b. 1944, San Antonio, Texas) in August of 2012 for a total of approximately 3 hours and 20 minutes. Dr. Strong came to MD Anderson in 1972 as a Research Associate in the Graduate School of Biomedical Sciences. She became a full-time assistant professor in 1976. Today she is a full professor and Chief of the Section of Clinical Cancer Genetics in the Department of Genetics at MD Anderson. She holds the Sue and Radcliffe Killam Chair, the first endowed chair created for a woman faculty member (in '81). Dr. Strong is best known for her discovery that a defective form of the p53 gene can be inherited and create a risk for many different cancers. The interviews take place in a conference room in the Department of Genetics in the Main Building of MD Anderson's main campus. Tacey A. Rosolowski, Ph.D. is the interviewer.

Dr. Strong received her Bachelor of Arts in Mathematics in 1966 from the University of Texas at Austin and went on to earn her M.D. from the University of Texas Medical Branch in Galveston in 1970. From 1970 to 1972 she held a post-doctoral Fellowship at the Texas Research Institute of Mental Sciences and the UT Graduate School of Biomedical Sciences, working with Dr. Alfred Knudson. She then came to MD Anderson for a position as a research associate in the Graduate School of Biomedical Sciences in 1972-'73, then held a position as a part time assistant professor in Pediatrics and Biology from 1973 to 1975. She advanced to full-time status the following year. She holds joint positions in the Graduate School of Biomedical Sciences, in MD Anderson's Department of Pediatrics/Biology and in Cancer Genetics in Breast Medical Oncology, In the Biological Sciences in the UT School of Public Health.

Dr. Strong has served ad interim Co-Director for Human Cancer Genetics Program Clinical Cancer Genetics, as Deputy Dept Chair, Dept of Experimental Pediatrics in the Division of Pediatrics, and as Director for Basic Research, Division of Pediatrics. Outside the institution, she served on NCI Data Evaluation Human Risk Assessment Project and President of American Association for Cancer Research ('96 – '97). She was appointed by President Ronald Reagan to two terms on National Cancer Advisory Board. Among her awards are the Outstanding Faculty Award from the Graduate School of Biomedical Sciences (1994) and the Charles A. LeMaistre Outstanding Achievement Award in Cancer (1999).

In this interview, Dr. Strong provides an overview of her research into cancer genetics in the context of that field. She speaks about her close working relationship with Dr. Alfred Knudson (Interview #34), whose "two-hit" genetic model for retinoblastoma (1971) revolutionized thinking about genetic predispositions to cancer. She speaks at length about her longitudinal studies of inherited genetics patterns of neuroblastoma, aniridia, and Wilm's tumor, leading to the discovery of the p53 tumor suppressor genes and its link to Li-Fraumeni syndrome in the early 1990s. She discusses the ethical issues raised by genetic testing, as well as the need for genetic counseling and support, new information processing systems, and greater awareness in all departments of the importance of genetic information. Dr. Strong also discusses the

challenges she faced as a woman faculty member. She offers her observations on how MD Anderson's rapid and dramatic growth has altered institutional culture.

## **Louise Connally Strong, M.D.**

Interview #22

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Segment 00B

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## Louise Connally Strong, M.D.

Interview #22

### Segment Summaries

Interview Session One: 8 August 2012

Segment 00A  
*Interview Identifier*

Segment 01  
*Genetics and Cancer in the Sixties and Seventies*  
A: Overview

Story Codes  
A: Overview  
A: Definitions, Explanations, Translations  
A: The Researcher  
D: Understanding Cancer, the History of Science, Cancer Research  
D: The History of Health Care, Patient Care  
C: Cancer and Disease

In this segment Dr. Strong sketches the first links that researchers made between cancer and genetics in the 1960s and '70s. Examination of chromosomal abnormalities in leukemia cells made it clear that cancer was connected to genetics, and research was being done on hereditary factors controlling retinoblastomas in infants. However, since most cancers do not follow an inherited pattern, she explains, most people were not examining the link, focusing instead on viruses and environmental factors. In medical school, her interest in inheritance and cancer made her unusual, as did the fact that she wanted to do research rather than practice medicine.

Segment 02  
*A Lucky Introduction to MD Anderson and Alfred Knudson*  
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

In this segment, Strong describes how working on MD Anderson's pediatric ward during her medical school residency helped convince her to focus on childhood cancer. An even stronger



factor was her period of post-doctoral study with MD Anderson geneticist, Alfred Knudson, MD, PhD, who was working on a genetic model for retinoblastoma. Dr. Strong explains the sheer luck of coming into Dr. Knudson's office and discovering that he shared her interest in inherited factors and could offer her a role on his research project. She also explains some of the characteristics of cancer as a disease that offered specific intellectual challenges.

### Segment 03

#### *An Unusual Route to Medical School*

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: Experiences re: Gender, Race, Ethnicity

A: Overview

A: Definitions, Explanations, Translations

Dr. Strong begins this segment by talking about her deep roots in Texas and Houston. (She is the only one in her family not born in Houston.) She also notes that her mother's family was in the sciences (her mother's father was a pediatrician); her father's family was in law. She excelled in the sciences in high school and majored in both mathematics and biology at the University of Texas-Austin, aiming toward a graduate program in genetics research. (She had been accepted at Stanford University.) She explains why she ended up going to the University of Texas Medical Branch in Galveston, Texas. She also talks about the isolation that she felt in medical school, as one of the only 5% of women in the program, and describes how she combated this by taking every opportunity to study in Houston. This is how she became connected to MD Anderson. She ends this segment with comments on the advances in medical technology (gene sequencing, for example, and the alteration of genes) that have enabled advancements in genetics that she never imagined would take place in her lifetime.

### Segment 04

#### *A Post-Doctoral Project on Childhood Cancer; Working with Alfred Knudson*

A: The Researcher

#### Story Codes

A: Professional Path

A: Inspirations to Practice Science/Medicine

A: Influences from People and Life Experiences

A: Experiences re: Gender, Race, Ethnicity

A: Overview

A: Definitions, Explanations, Translations

C: Portrait

In this segment, Dr. Strong goes into great detail about her work with Dr. Alfred Knudson during her post-doctoral fellowship. Dr. Knudson had been working on a "two-hit model of retinoblastoma." Dr. Strong first explains the scope of this study, clarifying that the "two hits" refers to the number of genetic mutations that lead to vastly increased chance for multiple

cancers. She explains the hypothesis and rationale of Dr. Knudson's study: he wanted to identify a scenario where a minimal number of factors and numbers of chromosomal changes would result in cancer. This study revealed that children with retinoblastoma had a mutation in which genetic material was *deleted*, and Dr. Strong points out that this approach and the outcomes set the stage for the discovery of tumor suppressor genes. She then goes on to describe how her post-doctoral project generalized Dr. Knudson's model to other cancers. She reviewed records of MD Anderson patients and looked for individuals who had been treated for retinoblastoma and who returned years later with cancer in other organs –neuroblastoma and Wilm's tumor (of the kidney), for example. At the end of this segment, Dr. Strong offers a very personal portrait of Dr. Knudson, who mentored her and taught her to question doctrine, to think from an analytical perspective, and also to not take herself too seriously.

#### Segment 05

##### *Discovering Contiguous Genes that Control Aniridia and Wilm's Tumor*

A: The Researcher

#### Story Codes

A: Professional Path

A: Influences from People and Life Experiences

A: Experiences re: Gender, Race, Ethnicity

A: Personal Background

A: Overview

A: Definitions, Explanations, Translations

At the beginning of this segment, Dr. Strong explains that she became a part time faculty member and had her children after her post-doctoral study. She realized, however, that she "would go nowhere" on part time status and joined the full time faculty with a position in the Medical Genetics Center in 1976. She then describes how she focused her research interests on childhood cancer and genetic epidemiology: she would look at individuals who had had retinoblastoma as tiny babies, who had been irradiated as part of therapy, and who had additional cancers, working with the assumption that this risk came from genetic predisposition. She explains two hypotheses that did not yield results, then explains how she discovered that aniridia (the absence of an iris in the eye) and Wilm's tumor (of the kidney) are controlled by contiguous genes. She could now go to patients, she explains, and give them information about their risks for developing Wilm's tumor or passing the predisposition to the next generation.

#### Segment 06

##### *The Discovery of the p53 Tumor Suppressor Gene*

A: The Researcher

#### Story Codes

A: The Researcher

C: Discovery and Success

A: Overview

A: Definitions, Explanations, Translations

C: Professional Practice

C: The Professional at Work

C: Collaborations

D: Understanding Cancer, the History of Science, Cancer Research

In this segment, Dr. Strong talks about a study that began in the 70s and has still not ended: the study of Li-Fraumeni syndrome. She explains the syndrome, first noting that Li and Fraumeni were unusual epidemiologists who were interested in “outlier, unusual events” that might, nonetheless be significant. They discovered families with many individuals who had multiple cancers and published a paper in 1969 proposing that this was a familial, and thus genetically linked, syndrome. Dr. Strong set up her own study in the 1970s, and she explains that she looked at MD Anderson patients treated for childhood soft tissue tumors between 1944 and the early 1970s, who had survived at least five years. Such a study could not be done today, she explains, given privacy laws. However, at the time, she located the families to take a history, look at risks for second cancers, and do cytogenetic studies. Of those she could locate, a surprising 96% of patients/families agreed to participate in the study, a testament, Dr. Strong believes, to the care they had received at MD Anderson and their commitment to help fight childhood cancer. Her study revealed that 5-10% of cancers came from inheritance, which fit the Li-Fraumeni model. At the time, she attended a talk at Cold Spring Harbor and heard that gene p53 seemed to be a tumor suppressor gene, and she became convinced that the Li-Fraumeni Syndrome was linked to this gene.

Dr. Strong then tells a story of how a technician, leaving some cultures of fibroblasts while on vacation, accidentally provided proof that normal fibroblasts were transformed by oncogenesis and became “immortalized” (i.e. they didn’t die when expected). This would have helped support the theory of the suppressor gene’s role in Li-Fraumeni Syndrome, but Dr. Strong explains that they could not get the results published because no one believed it –no one except Dr. Stephen Friend in Boston, who became a project collaborator. Dr. Strong recalls the moment when Dr. Friend sequenced the p53 gene and identified the acquired and inherited elements that would create a tumor. They were so excited and all went to Boston to write the paper (published in *Science* in 1990). Dr. Strong is also very moved by the memory of the knowledge she felt she suddenly had about individuals and their terrible risk of getting cancer. She then sketches the next steps taken to test samples from 25 families at MD Anderson, working with others in the Department of Genetics.

#### Segment 07

##### *The Next Phase of the p53 Tumor Suppressor Gene Story*

A: The Researcher

#### Story Codes

A: Character, Values, Beliefs, Talents

A: The Leader

A: The Researcher

C: Discovery and Success

A: Overview

A: Definitions, Explanations, Translations

C: Professional Practice

C: The Professional at Work

C: Collaborations

D: Understanding Cancer, the History of Science, Cancer Research

Dr. Strong begins this segment by noting that though she is a specialist in the genetic epidemiology, she did not really “fit in Genetics” at MD Anderson because the Department had no human genetics program. (She mentions her joint appointments Pediatrics and Department

of Breast Medical Oncology.) She describes how she has brought together teams of people who would never have worked together otherwise and also mentions her ability to get grants and to keep them going for long periods of time, finding new collaborators as others retire or leave. She notes her skills in creating groups that share resources and responsibilities.

Next, Dr. Strong explains that even though the discovery of the role of gene p53 in Li-Fraumeni Syndrome was established over ten years ago, the story is not over. She and her collaborators are currently studying over 100 families who show the mutation, and another 175 families that have a phenotype profile of the syndrome without exhibiting alterations of the gene. She is also very committed to putting together a team that will bring cancer screening for Li-Fraumeni Syndrome to MD Anderson using a rapid whole-body MRIs and other techniques. She cites project in Canada and in Utah where this screening has been done, with dramatic impact on survival rates. She has interest from clinicians in MRI and Imaging. Money stands in the way, and she describes the difficulties in funding a project of this kind. Dr. Strong explains that MD Anderson should be taking a leadership role in this screening, since it involves other areas in which MD Anderson is well known: development of imaging technology, sarcoma treatment, and chemoprevention, for example. She also notes the research and treatment benefits: if it can be shown that this kind of screen works with a high risk group, it will work for those in lower risk groups a well. (Dr. Strong continues with this topic in Segment 8.)

## Interview Session Two: 10 August 2012

Segment 00B

*Interview Identifier*

Segment 08

*Creating a Cancer Screening Program*

B: Building the Institution

Story Codes

D: Understanding Cancer, the History of Science, Cancer Research

D: The History of Health Care, Patient Care

C: Patients

C: Cancer and Disease

C: Discovery and Success

A: Overview

A: Definitions, Explanations, Translations

C: Professional Practice

C: The Professional at Work

D: Business of Research

D: Fiscal Realities in Healthcare

In a follow up to Segment 7, Dr. Strong goes into greater detail about plans to create a Screening Program for Li-Fraumeni patients at MD Anderson. She explains that in the past, screening programs were not established because there was little that clinics could offer patients if cancers or predispositions were discovered. (She also explains the international consensus that children should not be screened.) One year ago, however, results of a small

screening study in Canada was published, reporting that everyone who had not been screened had died and everyone who had been screened lived. Dr. Strong then discusses the issues to be considered when setting up a screening program: Should this be a clinical trial? Should it be randomized? Screening programs for Li-Fraumeni patients are expensive, involving rapid whole body MRIs, brain MRIs, breast MRIs, blood studies and other procedures every three to four months over the patient's life. Screening programs are already underway in the U.S. (in Utah, at the University of Michigan, and at the NCI). There has been good response from insurance companies. Dr. Strong notes that MD Anderson could offer MRI technology that is more refined than what is currently being used. She adds that it's key that MD Anderson offer the best clinical options for patients and reduce the expenses associated with cancer causing therapies. For Dr. Strong, this is the most important project for her to implement in the next year.

Dr. Strong explains that money is always the biggest obstacle to setting up such a program and notes that rapid whole body MRI has no CPT code for insurance purposes. She describes what is involved in educating an insurance company about the medical necessity of a procedure. She also explains why a program as intensive as the Canadian screening program may be difficult to maintain. She explains why she believes that a study supported by inter-institutional collaboration would be cost effective and produce more research results. Right now MD Anderson has a consortium of potential collaborators in Utah, at the University of Michigan, the Dana-Farber Institute, City of Hope, and several other institutions.

#### Segment 09

##### *An Ongoing Survivorship Study and Related Research*

A: The Researcher

#### Story Codes

A: The Researcher

D: Understanding Cancer, the History of Science, Cancer Research

D: The History of Health Care, Patient Care

C: Patients

C: Cancer and Disease

C: Discovery and Success

A: Overview

A: Definitions, Explanations, Translations

C: Professional Practice

C: The Professional at Work

D: Women and Diverse Populations

Dr. Strong's Mutational Model for Childhood Cancer is a study of survivorship ongoing since the 1970s. Dr. Strong first explains this study's relationship to her first work, with Dr. Alfred G. Knudson (at MD Anderson), on the "two-hit" model for cancer predisposition. She has incorporated the perspective that any existing genetic mutations creating a cancer predisposition will also be influenced by "mutagenic events," such as chemotherapy and radiation therapy, as well as environmental factors such as cigarette smoking and UV exposure.

Dr. Strong explains that this research evolved along with the increasing numbers of survivors of childhood cancer since the 70s who went on to have children with increased risk. Her studies follow all families of survivors of Wilm's tumor, and brain and bone sarcoma.

Dr. Strong goes on to note that she has participated since the mid 1990s in a large study of cancer survivorship (20,000 patients involved). The studies involve detailed examination of the treatments these patients received as well as tracking of subsequent cancers. She notes that the study will be starting a new cohort, as the treatments the original cohort received are not necessarily used today. These studies are very expensive, she notes, and funding may run out. She explains the funding supporting her Mutational Model studies via NIH RO1 grants. She also notes that this is a unique study: there are not a great many people studying genetics and childhood cancer. Nevertheless, she states that the NCI has recognized this study as unique and is funding it for the next five years. Survivorship studies are not in direct competition for funds with “moonshot” initiatives and drug therapy studies. The NCI has set aside money for survivorship studies and recognized them as a priority, and institutions tend to follow the NCI’s lead.

#### Segment 10

##### *Establishing a Clinical Cancer Genetics Program*

A: The Administrator

#### Story Codes

D: Understanding Cancer, the History of Science, Cancer Research

D: The History of Health Care, Patient Care

B: MD Anderson History

B: Institutional Processes

C: Professional Practice

C: The Professional at Work

C: Offering Care, Compassion, Help

C: Patients

C: Cancer and Disease

B: Building/Transforming the Institution

B: Critical Perspectives on MD Anderson

In this segment, Dr. Strong explain that, since her discovery of the role of the p53 gene in creating cancer risk, Dr. Strong has advocated that MD Anderson set up a genetic counseling service and support. The desire to have a clinical genetics program predated the discovery of BRCA, and Dr. Strong explains this history near the end of this segment. She begins, however, with a discussion of how the process unfolded after 1994, when the discovery of the “breast cancer gene,” BRCA, hit the media, raised many medical and social issues, and spurred women to demand genetic testing and counseling. Cancer centers all over the country had to address these issues and, though MD Anderson had many candidates for testing, Dr. Strong says that the institution was not a leader in setting up a genetic program. Eventually the administration responded to patient pressure to provide clinical genetic services. Dr. Strong lists others who agreed that genetic counseling and testing should be provided: Gordon Mill, Susan Peterson, Chris Amos, among others. They would gather informally at Baylor to discuss how to handle cases, as the medical and ethical issues raised were so new. After conversations with Robert Bast, Head of the Division of Cancer Medicine, and Frederick Becker, Vice President for Research, MD Anderson hired one genetic counselor. Dr. Strong describes how the program changed over the years, as more counselors were added to a central location, and then were decentralized, and attached to Departments where they could be effective members of teams. Dr. Strong describes the strengths and weaknesses of the programs, how unaware many researchers and clinicians are about genetic issues, and how she would like this program to grow in the next years.

Here Dr. Strong describes how the decentralized Clinical Cancer Genetics Program operate. It has nine genetic counselors and offers conferences for patient education. Dr. Strong notes that the leadership is not looking at how to reorganize the program, in which most dealings with patients are handled face-to-face. They hope to offer more education through video and satellite offering. She describes the time-intensive process of working with patients to identify their risk levels and talks about an exciting development in the fall, when the Cancer Genetics Program will link with PreCare [confirm name of this program] software to be tested in some MD Anderson departments. This program allows a patient to complete their background information prior to coming in. Dr. Strong explains the feasibility of creating algorithms to identify patients who should be referred for genetic counseling. Dr. Strong explains that she set up the information systems for her own research, and Cancer Genetics set up their own network that can draw pedigrees and do analyses of them. This is the system that will be linked to PRECARE.

#### Segment 11

##### *A Philosophy of Genetic Information and Its Integration into MD Anderson*

A: Overview

#### Story Codes

A: Overview

A: Definitions, Explanations, Translations

D: Cultural/Social Influences

D: Ethics

C: Cancer and Disease

A: Professional Values, Ethics, Purpose

In this segment, Dr. Strong discusses several issues that emerge as genetic information is available to patients and to institutions. Though individuals still believe that “they are their genetic information,” Dr. Strong believes that eventually genetic information will be less stigmatizing and regarded as equivalent to other kinds of medical information. She believes this will take some time, but surveys show that most individuals respond positively when asked to join gene sequencing studies. They want their information to be shared, which she sees as a positive sign. In the medical community, she explains that there are still gaps between genetics and departments that are unaware of the importance of genetic information. She explains that there is a generational factor –how much genetics one had as part of medical training, and how much contact a clinician or researcher has to a geneticist as part of a team.

#### Segment 12

##### *The First Woman Faculty Member with an Endowed Chair*

B: Diversity Issues

#### Story Codes

A: Professional Path

B: Gender, Race, Ethnicity, Religion

B: Philanthropy, Fundraising, Donations, Volunteers

A: Activities Outside Institution

A: Personal Background

A: Career and Accomplishments

Dr. Strong explains the factors that led her to become the first female faculty member at MD Anderson with an endowed chair (1981), eventually named the Sue and Radcliffe Killam Chair. She explains that ideas of genetics in cancer were new. She also traces the roles she played on the national stage, adding to her reputation. In 1975, when she was asked to give a talk at the National Cancer Advisory Group and then invited to be part of the NCI Data Evaluation Human Risk Assessment Project ('76 – '80), she took on responsibility for preparing reports on the dangers of toxins. She then was on the Board for Epidemiology, part of the Board of Scientific Counselors, then on served on the National Cancer Advisory Board. She also notes that the Killams, who endowed the chair, were family friends, though she explains that she does not know if they were aware how their funds were being directed.

### Segment 13

#### *Growth and MD Anderson Presidents*

B: Institutional Change

#### Story Codes

B: MD Anderson History

B: Critical Perspectives on MD Anderson

B: Growth and/or Change

B: Obstacles, Challenges

C: Portraits

Dr. Strong first comments briefly on how lucky Texans are that a few visionaries purchased some swampland and built a cancer center that is a huge benefit to Texas and known all over the world. She also briefly notes that her grandfather was the first pediatrician in Texas, when pediatrics was a very new specialty. She then lists several downsides of MD Anderson's growth and restructuring as a corporation. She notes the expansion of administration, a non-money making sector of the institution, though she notes that the attitudes toward patients continues to be outstanding. She would like to see better communication between the administration and faculty, and tags hierarchies as the main impediment to any free flow.

Dr. Strong recalls Dr. R. Lee Clark's fast decision-making, his loyalty, and his focus on patient care and innovative therapies such as radiation. She did not interact extensively with Dr. Charles LeMaistre, but recalls with concern a period in the 80s and 90s when she believed patient care was not as good as it might have been due to financial difficulties the institution faced. She notes that situation changed completely when Dr. John Mendelsohn assumed the presidency and established more effective processes for patient care. She recalls he was very hands on in recruitment, but with time became more isolated. She sees Dr. Ronald DePinho as a strong basic scientist anxious to raise MD Anderson's reputation in this area, but she expresses concern about how quickly he seems to expect the culture of MD Anderson to change. She also feels he may not be attending to the needs of clinicians, who have had no respite since 2008, when they were expected to increase their patient loads to contribute more financially to the institution. At the end of this segment, Dr. Strong explains that Dr. DePinho's work developing drugs that target the genetic makeup of tumors intervenes differently in the progress of cancer than her own genetic studies.



## Louise Strong, MD

Interview Session 1—August 8, 2012

### About 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*

**0:00:02.5**

Okay. I'm Tacey Ann Rosolowski and we're interviewing Dr. Louise Strong at the [University of Texas, MD Anderson Cancer Center](#) in Houston, Texas. This interview is being conducted for the [Making Cancer History Voices Oral History Project](#) run by the Historical Resources Center at MD Anderson. Dr. Strong holds the Sue and Radcliffe Killam Chair in the Department of Genetics at MD Anderson Cancer Center, and she is of course a full professor in that department. This interview is taking place in a conference room in the Department of Genetics, in the main building of MD Anderson Cancer Center, and this is the first of two planned interview sessions. Today is August 8, 2012 and the time is 10:15. I wanted to just say it's really a pleasure to be talking to you, Dr. Strong, and thank you very much for taking the time to participate in the project.

*Louise Strong, MD*

**0:00:51.4**

Thank you.

Interview Session: 01  
Interview Date: August 8, 2012

## **Chapter 1**

### **A: Overview**

#### ***Genetics and Cancer in the Sixties and Seventies***

#### **Story Codes**

- A: Overview
- A: Definitions, Explanations, Translations
- A: The Researcher
- D: Understanding Cancer, the History of Science, Cancer Research
- D: The History of Health Care, Patient Care
- C: Cancer and Disease

***Tacey Ann Rosolowski, PhD***

**0:00:52.3**

As we spoke about, I wanted to ask you kind of a general question about the history of genetic work, because when you entered the field in the seventies the links—genetics was really just beginning to be understood and I wanted to ask you how it came to be that you made the link between genetics and cancer, and then how that link came to transform—how we understand the way the disease operates?

***Louise Strong, MD***

**0:01:28.4**

Well, in the 1960s genetics was really not thought to play much of a role in cancer at all in the sense of inherited genetics—the classic Mendelian-type transmission of genes from one generation to another; however, we did note that tumor cells—at least leukemia cells, which were the ones we could look at most easily—most clearly. We did know that they had some genetic changes. Chromosomes were all mixed up. Now we had only fairly recently figured out how many chromosomes were supposed to be there so they were not—the abnormalities were not clearly identified, but it was clear that leukemia cells looked different than normal cells from a chromosomal perspective.

***Tacey Ann Rosolowski, PhD***

**0:02:16.1**

What were the differences?

***Louise Strong, MD***

**0:02:18.4**

The normal cells—there are twenty-three pairs of chromosomes. In all but one pair they are one from mother and one from father, and they look alike. They're the same size and shape. The sex chromosome pair can be different if it's an XY male. But in leukemias sometimes there were

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extra chromosomes. Sometimes chromosomes were broken. You saw chromosomes that didn't look like any of the normal chromosomes in some cases, and it was actually known fairly early on that children who had Down syndrome who had an extra chromosome twenty-one also had a higher risk of leukemia, so it was thought that perhaps that chromosome—that extra chromosome played a role. There were also extremely rare instances where it seemed that there was an inherited predisposition to cancer that was passed on, and that was most evident in a rare childhood cancer called retinoblastoma, and it was easy to see that because these are infant tumors. They occur usually before the age of two if it's inherited. So it's easy to see that pattern over generations, and it was a tumor that could be successfully treated by removing the eye, or in some cases both eyes, but it could be successfully treated so these children could grow up, become adults, become parents, and you could see this pattern repeat itself. But to my interest in it, I really came in with an interest in genetics. I got very excited about biology and learning about DNA and genes and what we knew in the sixties, and so my interest in going to medical school was actually to go into genetics—to go into human genetics, medical genetics, and genetics research. I was not the typical medical student. I got interested in cancer somewhat independently because, living in Houston, I had had summer jobs out here at MD Anderson as a student and I had learned to do chromosome analysis, as I mentioned, before ever going to medical school. So I, in trying to figure out if I was going to go into genetics—what area of genetics—it seemed to me genetics and cancer would be a good one, and there were very few people who were really thinking about that as a career path.

***Tacey Ann Rosolowski, PhD***

**0:05:16.3**

Why was that? I'm sorry to interrupt you.

***Louise Strong, MD***

**0:05:18.9**

Well, most cancers did not seem to be following a familial pattern, and you could look at a lot of human disease today where we now know there is a genetic component, but most cases are not black and white inherited. There was interest in environmental factors. There was interest in viruses. We didn't have too many good ideas. We did certainly have the more than ten years, I think, of the Surgeon General's report on smoking, so we knew some environmental factors were important. There was a lot of interest in viruses and there was the national virus program in 1970 I think it was. But genetics was not really a focus at all. So when I was trying to figure out exactly what to do next to get into genetics and cancer after medical school, and knowing that I did not really want to practice medicine and that I really wanted to go into research, I had done electives here at Anderson as a medical student and so when I was here on an elective I went to talk to the Office of Education about the possibility of doing a post-doctoral fellowship, and in particular I wanted to do something in pediatric cancers because it seemed if there was a major genetic predisposition, it would be more likely to show up in pediatrics where you don't have a long latent period like four years of smoking or something. You have something that occurs in a

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young child. I had been on the pediatric oncology ward, and I knew we had very young children, and I had read about retinoblastoma, for example, and—

*Tacey Ann Rosolowski, PhD*

**0:07:13.6**

Excuse me, now were you part of the—were you on the pediatric oncology board when you did a rotation—or how—?

*Louise Strong, MD*

**0:07:19.8**

I did a rotation as a medical student. You have electives that you can do, and so I had done an elective in pediatric oncology.

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## **Chapter 2**

### **A: Educational Path**

#### ***A Lucky Introduction to MD Anderson and Alfred Knudson***

##### **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

##### ***Tacey Ann Rosolowski, PhD***

**0:07:29.2**

Can I also ask you another question? I'm really curious about that period of time when you were focusing your attention on that link between cancer and inheritance. How did that evolve? How did that idea and commitment to focusing on that area evolve for you?

##### ***Louise Strong, MD***

**0:07:50.6**

Well, I was always more interested in why people got cancer, in particular for children. I was always somewhat from a scientific perspective more interested in why did they get that, rather than just thinking about how do we treat it? As I say, I came into medicine with a goal of research in genetics, not focusing necessarily on cancer initially. But once I sort of walked in that door to the office of education at MD Anderson, it wasn't the only thing I was exploring. I was looking at congenital heart disease as another option. I had done electives in that over at Texas Children's as well. But I was incredibly lucky in that the person who was in—who led the office of education at that moment—was someone named Alfred Knudson, and I had no idea who he was or what he did, but he was just the person behind the desk that day. I don't think there is anyone else who has ever held that position at MD Anderson who would have given me five minutes of their time, but he was later also dean of the Graduate School of Biomedical Sciences—an MD/PhD—and he was a geneticist, and he was actually working on a genetic model for retinoblastoma at the time. Now I had not done the homework. I didn't know any of that, and I walked in and said, "I'd really be interested in trying to work out a post-doctoral fellowship. I'd like to do some work in the area of genetics and childhood cancer. Do you think that's a possibility?" He said, "Well, you know I'm actually interested in that area as well." He said, "Would you like to do a fellowship with me?" and I said, "Yes!" So that was just incredibly fortunate. If he had not been there that day I'm not sure exactly what I would have done. I was more interested in cancer than the congenital heart disease for various reasons, but I really don't know exactly what I would have done.

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*Tacey Ann Rosolowski, PhD*

**0:10:18.6**

Can you tell me, what were those reasons why you were so interested in cancer?

*Louise Strong, MD*

**0:10:22.5**

Cancer is such a distinct end point. I mean there are lots of diseases that can be sort of a wide range—and, yes, there's a wide range of cancers, but cancer just has an impact, a kind of definitive type statement that not very many diseases have, and for that reason it seemed like it was something that you—as I say, you have an end point—I want to know what caused that—not something that was kind of ongoing or more of a long-term process, at least that was how it seemed to me at that time.

*Tacey Ann Rosolowski, PhD*

**0:11:11.1**

So from a research perspective you felt like you could kind of target your—

*Louise Strong, MD*

**0:11:14.3**

That life was more tangible somehow. Anyway, obviously it was an important disease, and we had a center here in Houston, and so there were resources available to study. I mean to study congenital heart disease you had to be much more of a physiologist and understand why the abnormality caused the problems it did, and it was not as kind of all or nothing.

*Tacey Ann Rosolowski, PhD*

**0:11:54.7**

How well prepared did you feel for the post-doctoral you took up with Dr. Knudson?

*Louise Strong, MD*

**0:11:59.2**

Oh it was great, because I had been a math major as an undergraduate and so what we did were sort of statistical studies, and I knew a little something about childhood cancers because I had spent the time in the clinic and as a medical student you had to also write up a project and that kind of thing so I had learned something from being on the wards as well as from being around MD Anderson and going to lectures and things like that, so I felt as prepared as I might have been and loved working with him and I got a lot of ideas that I still pursue from those years. It was a great experience, and I don't think I had any idea at the time how fortunate I was.

*Tacey Ann Rosolowski, PhD*

**0:13:03.2**

That you walked into that office at that particular moment. That's pretty incredible.

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## **Chapter 3**

### **A: Educational Path**

#### ***An Unusual Route to Medical School***

#### **Story Codes**

- A: Personal Background
- A: Professional Path
- A: Inspirations to Practice Science/Medicine
- A: Influences from People and Life Experiences
- A: Experiences re: Gender, Race, Ethnicity
- A: Overview
- A: Definitions, Explanations, Translations

***Tacey Ann Rosolowski, PhD***

**0:13:03.2**

That you walked into that office at that particular moment. That's pretty incredible. Could we go back a bit and get some background research and then we'll come back to that moment when you come to MD Anderson and are working with Dr. Knudson because it seems like just a real pivotal—pivotal time obviously. Well, it seems very basic but pretty necessary, just where were you born and when?

***Louise Strong, MD***

**0:13:34.7**

I was born—I was a war baby. I was born in 1944 and my parents had lived in Houston before the war, but my dad was in the judge advocate unit, and he was stationed at San Antonio at the time, so I was born in [Brooke General Army Hospital](#) there. My brother was born in Houston. My mother was actually born in Houston, so it's very painful for me to admit that I was not born in Houston.

***Tacey Ann Rosolowski, PhD***

**0:14:00.5**

So you really have a sense of yourself as a Texan and a Houstonian.

***Louise Strong, MD***

**0:14:03.6**

Yes, yes, yes. Both my parents were born in Texas and some of their parents were born in Texas so I have deep roots here.

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***Tacey Ann Rosolowski, PhD***

**0:14:15.3**

Did you grow up in Houston?

***Louise Strong, MD***

**0:14:16.5**

I did. I did. So as soon as the war was over they moved back to Houston.

***Tacey Ann Rosolowski, PhD***

**0:14:21.1**

I see. Now was anyone else in your family involved in the sciences or in medicine?

***Louise Strong, MD***

**0:14:29.0**

My mother's father was a pediatrician. Now I never knew him. He died long before I was born, so I never knew him at all. My mother was always sort of interested but she didn't really actively do anything. She had gone to [Rice](#) and had I guess also been a math major, and so there was sort of a math/science background from her side of the family. My dad was from a very strong legal background and not really so much involved in sciences.

***Tacey Ann Rosolowski, PhD***

**0:15:13.5**

But you gravitated toward the sciences. How early did you know that?

***Louise Strong, MD***

**0:15:18.2**

Not really until—well, in high school. My first biology class was ridiculous. It was kind of like a general science and I thought I hated biology, but then I really liked physics and, being interested in math, I did things all wrong. I thought chemistry was going to be too much like biology so I didn't want to take chemistry so I took physics. Well, I basically had to learn chemistry; too, to get by in physics so then I went back into chemistry, which was of course very easy having already basically been through it. So I kind of backed into it. When I went to college I definitely was interested in science. I was not pre-med. I didn't really know exactly what I was going to do with it, but I found the things I explored in math, per se, I found became less and less interesting, and I was in plan two at University of Texas, and they kind of make you take—it's basically a liberal arts kind of background.

***Tacey Ann Rosolowski, PhD***

**0:16:26.4**

And you went to the Austin branch?



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*Louise Strong, MD*

**0:16:28.8**

Yes, the main campus. So I took chemistry, and they had a biology course, which I took, which was really outstanding, so I got very interested in biology then and—

*Tacey Ann Rosolowski, PhD*

**0:16:44.8**

What was it that got you excited about biology in that class?

*Louise Strong, MD*

**0:16:48.0**

I think it was more the genetics. So I started taking genetics courses, and in those days—and maybe today, too—I went to [Lamar High School](#). I had a very good background. We took calculus and all that kind of thing in high school, so I could place out of a couple of years of math in college, so I had plenty of room to take lots of biology, genetics—including graduate courses while I was there so I ended up with a double major in math and biology, but the last couple of years were much more heavily biology/genetics oriented.

*Tacey Ann Rosolowski, PhD*

**0:17:24.8**

How many women were in the programs you were in at that time?

*Louise Strong, MD*

**0:17:31.5**

There were a fair number of women in biology. There were certainly plenty of women in plan two. There were very, very few women in the math classes and very few women in the physics classes.

*Tacey Ann Rosolowski, PhD*

**0:17:44.8**

What was that like being, you know, “the only woman in the room”?

*Louise Strong, MD*

**0:17:49.2**

Well, it was a little bizarre, but I think things were pretty—things were very friendly in those days so it was much more painful, I suppose, in medical school because there you’re much more isolated.

*Tacey Ann Rosolowski, PhD*

**0:18:15.3**

And you went to medical school in the medical branch at [Galveston](#)?

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*Louise Strong, MD*

**0:18:18.2**

Right, right, I did. I was planning to go to graduate school up until March of my senior year. I was going to go to graduate school in genetics, and I was actually accepted. I was going to go to Stanford. Then, when I visited with people from Stanford who came to Austin to meet me, everything was so basic lower organism. There was nothing that even approached human genetics or medical genetics at that time, and I was really interested in medical genetics. Then other people began to tell me that, “Well, I know you want to do research in humans, but you’re going to have to have an MD degree if you’re going to think you can lay hands on people.” Even some of the PhDs I was training with at the time actually began to sort of recommend considering medical school. So the reason I went to Galveston was because almost every place else had closed their admissions, and I would have to wait a year. I really was not particularly excited about going to Galveston, but any out of state school or anything was out of reach for another year, and it never occurred to me that it might make sense to wait a year.

*Tacey Ann Rosolowski, PhD*

**0:19:54.1**

So you started medical school in 1966? Is that correct?

*Louise Strong, MD*

**0:19:58.5**

Yes.

*Tacey Ann Rosolowski, PhD*

**0:19:59.1**

Now you said—well, tell me about that program, and you also mentioned that you felt rather isolated as a woman, so maybe you can—

*Louise Strong, MD*

**0:20:04.6**

Well, there were very few women in medical school, and in Galveston in particular it was a—there wasn’t much economy there. There were very few other young people. See, when you’re at University of Texas campus, even if in your class you’re one of the few women, you’re surrounded by everybody, and you have plenty of other classes where you’re with a mix of people so you meet people and all that. When you go to Galveston Medical School it’s very hierarchical and so you’re at whatever level you are, and then there are the medical students ahead of you, and then the interns and residents, and then there are the faculty, and there’s nobody else to socialize with. I mean there was not much down there. So if you’re one of a handful of women in the class and they’re all living in the fraternity houses and you’re living with one roommate or by yourself and they all fraternize, and when you’re in a group that’s that

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many men they don't pay much attention to one—it's not, you know, the manners and things like that are not what you are used to at all. I loved the fact that I lived in Houston—that my parents lived in Houston and I could go back and forth a fair amount, and I made every effort to keep in close touch with my friends in Houston, and I did electives in Houston. I did electives elsewhere as well. I didn't just do that in Houston, but I used every opportunity I could to get off the island.

***Tacey Ann Rosolowski, PhD***

**0:21:59.7**

Did you feel that the way that women were isolated had a professional effect within that medical experience? Obviously you made attempts to get out, but if there were women who weren't doing that, could you see that there were some professional effects from that isolation?

***Louise Strong, MD***

**0:22:20.6**

Well, I think, first of all, we all knew going in that there were not very many women. It's just that I didn't realize how isolated you were when you're five percent of the group and the other group is all—I can't think of a nice way to say this, but there was no reason for them to behave decently down there. There were not a lot of people that they were dating or whatever like that so it was pretty rough, and it was just not much fun. I'm probably exaggerating a bit because we all got through it fine. We did study with people when it was time to study. We were all pretty good students and so some of the other good students would—we'd study together, but it just—it's a very—it was just a little more isolated than I think I was initially prepared for. But it was fine. I mean you got through it and were happy to be out of there. I don't look back on it as my favorite—the favorite time in my life, but I was thrilled to find this position to work in Houston, and at Anderson, even though there were very few women—Anderson was, of course, much, much smaller then, and within a reasonable time period, even as a little post op, you knew a lot of the people. There were certain lectures that kind of everybody went to, and so you learned an awful lot about cancer easily and it was pretty friendly. I didn't have the same sense of isolation that I did in medical school.

***Tacey Ann Rosolowski, PhD***

**0:24:25.2**

You had worked in a pathology lab as well at MD Anderson—

***Louise Strong, MD***

**0:24:29.6**

That was doing—actually that was doing [cytogenetics](#). That was a summer fellowship when I was probably in college and that's where I learned chromosomes—how to analyze chromosomes by the technology that was available in those days.

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***Tacey Ann Rosolowski, PhD***

**0:24:47.7**

And what was that technology?

***Louise Strong, MD***

**0:24:53.1**

I said there are twenty-three pairs and you just group them kind of by size and so there were different groups, but within the group it was very difficult to discriminate between one and another. They were grouped by size and shape, but now we know the bands of each chromosome and we know where the genes are lined up and so forth, but we could count chromosomes in those days and we could tell if there was something way out of whack. We could certainly identify Down syndrome patients and, as I mentioned, some of the leukemia chromosome abnormalities were known.

***Tacey Ann Rosolowski, PhD***

**0:25:28.6**

You've seen enormous changes in technology, that's for sure.

***Louise Strong, MD***

**0:25:32.0**

We would have never dreamed we'd be doing the things we're doing now. I had never dreamed in my lifetime I would see that.

***Tacey Ann Rosolowski, PhD.***

**0:25:38.9**

What's one of the most amazing innovations that you wouldn't have thought of back then?

***Louise Strong, MD***

**0:25:43.9**

The idea that we could sequence the genome, the idea that we could then identify sequence variants in genes the way we do. You know, conceptually one could identify that someday in the distant future it could be done, but as I say, that I would actually see it happen was not something that I expected. I just thought we would have projects of trying to locate and identify genes for some of the cancers for the rest of my life. It never occurred to me we would actually sequence them and know exactly what the change was and begin trying to figure out ways to change that and so forth. I just didn't expect to have things move quite so quickly.

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## **Chapter 4**

### **A: The Researcher**

#### ***A Post-Doctoral Project on Childhood Cancer; Working with Alfred Knudson***

#### **Story Codes**

A: Professional Path  
A: Inspirations to Practice Science/Medicine  
A: Influences from People and Life Experiences  
A: Experiences re: Gender, Race, Ethnicity  
A: Overview  
C: Discovery and Success  
A: Definitions, Explanations, Translations  
C: Portrait

#### ***Tacey Ann Rosolowski, PhD***

**0:26:47.0**

So in 1970 you started your post-doctoral. That's correct? Okay. Could you tell me about how you were integrated into lab and what you were doing and what that project was all about?

#### ***Louise Strong, MD***

**0:27:01.6**

Well, actually I was reviewing medical records and medical literature on certain specific childhood cancers and trying to identify—let me go back just a minute—Al had written—he'd really worked out the paper he wrote on retinoblastoma—on a [two-hit model](#) for retinoblastoma without me. I was not part of that.

#### ***Tacey Ann Rosolowski, PhD***

**0:27:29.2**

I'm sorry, what is that two-hit model? I came across that phrase and—

#### ***Louise Strong, MD***

**0:27:35.0**

Retinoblastoma was the tumor that was probably the most evident as being inherited in a predictable way. We knew [Mendel's peas](#) and Mendelian inheritance and such, and inherited in a dominant way, which would mean that for the gene responsible for retinoblastoma—we assumed there was such—you would inherit one—one that was abnormal—that was mutant—from the parent who carried that, and you would inherit one copy that was normal from the other parent, so now you've got two copies of the gene. That's how your zygote—your embryo starts out—with one good copy and one mutant copy. This zygote develops into a perfectly normal fetus—the right number of arms, and legs, and eyes, and nose—I mean everything is fine, but there is a

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tendency for tumors to develop in the retina of the eye, and you can see little punctate lesions in some cases where there's more than one separate tumor—independent tumor—not tumors that have spread from one to the other, but independent—and they can develop in both eyes. So, again, that supported the fact that they were independent. They weren't spread from one eye to the other. Now if you look at all children with retinoblastoma, the tumors occur from infancy up to about age four or five. Most of them occur at the younger side of that, and after that it's incredibly rare to see a new retinoblastoma develop, so it was thought that this has to do with kind of embryonic development, and at some point the cells have differentiated and they're not—they can't go backwards. What Al did with the retinoblastoma, he had noticed—and other people had as well—that in the familial cases of retinoblastoma the tumors were most often bilateral—occurring independently in each eye, and they occurred at an earlier age. Now you might think if they're going to develop in both eyes that it's going to take longer, but these were actually occurring—even in both eyes—earlier. So he was thinking in statistical models of, “Okay, you inherit this mutation. What else has to happen for a tumor to develop?” He looked at the age of onset for retinoblastoma in the inherited cases, and he made the assumption that all cases in which both eyes were involved had to be inherited because you had something independent in each eye and because there was very good data for that. There had been studies from registries in some of the Scandinavian countries—you know they have fabulous registries of everything there. They had actually followed children who had had retinoblastoma as infants and who had lived and had children of their own, and if they had bilateral retinoblastoma, the risk of retinoblastoma in their offspring was almost a perfect fifty-fifty. That's [Mendelian genetics](#). If they had had unilateral—just single-eye—retinoblastoma the risk was much, much lower. It was maybe five percent or something, but it was a clear, big difference—and not because they weren't evaluated or anything like that. It was a very big difference. When Al looked at the age distribution he asked, “Okay, we know something else has to happen. If you inherit a mutation, something else has to happen. You're fine at birth. You develop normally. Sometimes one eye is fine. So what is it that has to happen?” As a geneticist you could think about genetic alteration. I think by that point in time—actually from almost early 1900s—there was thought that [somatic mutation](#) was possibly important in cancer, and chromosomal aberrations would count as that—extra numbers of chromosomes. It also could be at a single gene level. But that somatic alteration was important in cancer development. It could be caused by smoking. It was kind of a unifying theory that somatic mutations were important in cancer. So he asked whether the age distribution of cancer in those with the inherited form of retinoblastoma—the familial and/or bilateral—did they fit a distribution that would fit a single-hit event—or multiple hits? How many hits? And then how did that distribution compare to the presumably non-inheritable, just sporadic, non-familial unilateral cases?

*Tacey Ann Rosolowski, PhD*

**0:33:14.0**

So the hit refers to—

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***Louise Strong, MD***

**0:33:15.0**

The hit refers to the number of mutations. So if you're inherited you've got one hit, and the age of onset distribution of those inherited cases for cancer to be identified—to be diagnosed—really pretty smoothly hit a two-hit phenomena, and the unilaterals hit a kind of messier model. In other words, if you inherit one hit you just have to have one more hit, so that would give you the two hits. So his hypothesis then was that retinoblastoma—one of the things he wanted to ask was what would be the simplest cancer? If you want to get down to the most basic, minimum things for cancer what would be the simplest cancer? Retinoblastoma was a good model because it occurred at such an early age. Then there was the question of what would be the fewest number of genetic changes. Other people had developed statistical models just from looking at age of onset of cancer and there fact that most cancers increase as we age and it's not a straight line. It's not linear. You've got a curved line where it increases more rapidly as you really age, and so those models had predicted cancers may have to have seven or eight or some large number of genetic changes. So one of the questions he was asking was could any cancer be as few as two?

***Tacey Ann Rosolowski, PhD***

**0:34:52.8**

Well, I'm seeing the advantage of—or maybe I'm seeing the advantage of working with very, very young children who haven't received the environmental factors.

***Louise Strong, MD***

**0:35:02.7**

Right. So his model was very simple. It became something that everybody sort of thought at least made sense, and it became widely cited. Now he didn't try to say what that second hit was—whether it involved the other retinoblastoma gene or whether it involved some other gene somewhere else in the genome. That came later. But it set the stage for what came to be known as [tumor suppressor genes](#) because we tended to think of genes that would cause cancer as genes that got turned on wrong, and so they made a product that shouldn't have been there and it told a cell to do something. We figured out from chromosome analysis that some children with retinoblastoma had a deletion of a region of a chromosome that we knew from family studies was the region, grossly, that included the retinoblastoma gene, and so this said, “Hmm, how does loss of genetic material predispose to cancer?” That didn't quite fit either. Ultimately, it was shown that for retinoblastoma tumors to develop you basically have a loss of function of both your maternally- and paternally-inherited genes, and one of those may be inherited, and then the other is the second hit, but it's a loss of function. So that's called a tumor suppressor gene because the normal function suppresses cancer, prevents cancer, reduces your risk of cancer, and when you lose that function then cancer can develop. [Time Magazine](#) did a little cartoon of two soldiers were the two normal genes, and when you had a single hit you had one soldier that was knocked down dead, and so you just had one soldier, so it was kind of weak, and if anything happened to that guy then he went down and then the obscure, claw-hand of cancer could come.



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Anyway, I remember that very well. That was how they made a cartoon to depict the tumor suppressor gene and two-hit model concepts.

*Tacey Ann Rosolowski, PhD*

**0:37:55.9**

So tell me, you said that Dr. Knudson had worked out a good part of this model before you came to work with him, so what—when you came in—

*Louise Strong, MD*

**0:38:06.6**

My project was to say, “Is this generalizable? How does this fit some other childhood cancers?” So I reviewed all the medical records of the MD Anderson cases that had been treated here and got the age at diagnosis, and whether it was unilateral or bilateral. We looked at tumors where you could have more than a single organ. In other words, we looked at kidney tumors—[Wilms’ tumor](#) of the kidney. We looked at neuroblastoma, which can be in the adrenal gland, although also some other places. So we looked at things that had at least paired organs so you could have the ability to say, “Well, those that have more than a single tumor site ought to be inherited by this model and look at the age of onset for those compared to the others.” Then research out the—unlike retinoblastoma, familial cases of most of the other is extremely rare, and so we pulled out the few cases in the literature that existed and maybe I dug up a case or two that had been at MD Anderson. Then we did the same type of analysis for Wilms’ Tumor of the kidney, for neuroblastoma, and then for a number of other syndromes that are related in some way or another to neuroblastoma, and so we published a series of papers on that, sort of making the case that this two-hit model could be generalized to other tumor types.

*Tacey Ann Rosolowski, PhD*

**0:39:43.6**

Tell me about working with Dr. Knudson and what you got from him.

*Louise Strong, MD*

**0:39:52.8**

He is one of the most thoughtful people I know, and I mean thinking thought, not just being nice. He has always got some new idea. He has got some new way of looking at things. You can take some simple dogma that everybody knows it’s this way and he’ll have a, “Well, but what if you look at it that way?” kind of approach to things, and he’s always gentle and gentleman as well—using those in sort of different ways, but he’s excited about science. He thinks about—he’s not one of these people that just is driven and intense all the time. He’s not that kind of hard-driven person. He’s a person who enjoys life but is really never too far away from thinking about kind of the next idea in science.



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***Tacey Ann Rosolowski, PhD***

**0:41:12.2**

What is his style of working with others—as a mentor or as a collaborator?

***Louise Strong, MD***

**0:41:17.0**

It's very easy. He gave me books to read. [\*Molecular Biology of the Cell\*](#) I think was a new thing that was out at that point. So each week we would discuss a different chapter and the concepts about it and such as that, and then we'd go over data of course intermittently and discuss that. He was very easy to work with.

***Tacey Ann Rosolowski, PhD***

**0:41:49.1**

Did you feel like he was a mentor?

***Louise Strong, MD***

**0:41:50.5**

Oh yes, absolutely. Unquestionably.

***Tacey Ann Rosolowski, PhD***

**0:41:53.7**

And how did that—I mean what were some of the big lessons you learned from him that carried you forward?

***Louise Strong, MD***

**0:42:04.3**

I learned a lot about questioning things, about not just assuming that everything was the way people said it was, and I guess I learned to try to think about something from a kind of analytic perspective, and—I don't know—maybe also not to take myself too seriously. I mean he was a very good—and still is a very dear friend. He was just absolutely delightful. He would always have some interesting questions and angles that I would never have thought of. It was just really delightful—

***Tacey Ann Rosolowski, PhD***

**0:43:07.2**

It sounds like he was always inspiring innovation.

***Louise Strong, MD***

**0:43:09.4**

He was. He was, very much so.

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## **Chapter 5**

### **A: The Researcher**

#### ***Discovering Contiguous Genes that Control Aniridia and Wilms' Tumor***

##### **Story Codes**

A: Professional Path

A: Influences from People and Life Experiences

A: Experiences re: Gender, Race, Ethnicity

A: Personal Background

A: Overview

A: Definitions, Explanations, Translations

##### ***Tacey Ann Rosolowski, PhD***

**0:43:13.1**

An interesting leadership style, too. Tell me how you came to switch from being post-doctoral to becoming actually a member of faculty here.

##### ***Louise Strong, MD***

**0:43:25.7**

Well, of course your goal is always to grow up.

##### ***Tacey Ann Rosolowski, PhD***

**0:43:29.1**

But you might have moved to another institution, too.

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*Louise Strong, MD*

**0:43:31.5**

Normal people would. After I worked with him and sort of finished the post-doctoral period it was kind of timing where I became pregnant, and so I worked throughout the pregnancy and then I worked part time for about a year and a half while I had the kids.

*Tacey Ann Rosolowski, PhD*

**0:43:59.3**

Where was that?

*Louise Strong, MD*

**0:44:01.4**

I was in an in-between stage so it really didn't bother anybody much. We had this thing called the medical genetics center that Al was head of, and that involved UT, what's now the School of Public Health. It was a population and demographic genetics group at MD Anderson. So I had sort of a research assistant—not a research assistant—research associate-type position there, but I wasn't really reporting too much to anyone. I was carrying on small projects to be working part time. I could stay up with what was going on. I could write an occasional paper, and I still met with Al regularly.

*Tacey Ann Rosolowski, PhD*

**0:44:49.4**

So this was 1973 to 1975?

*Louise Strong, MD*

**0:44:52:1**

Right, exactly.

*Tacey Ann Rosolowski, PhD*

**0:44:54.2**

Sounds ideally suited if you're starting a family.

*Louise Strong, MD*

**0:44:56.8**

It was. I was very lucky. I was very lucky, but I also realized that I wasn't going anywhere that way. So in 1975 I came back to work full time, and then I certainly kept—

*Tacey Ann Rosolowski, PhD*

**0:45:12.2**

How did that happen? I mean did you just sort of ring up Dr. Knudson and say—

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***Louise Strong, MD***

**0:45:17.1**

Well, he called me. I saw him periodically during the time that I was either really on maternity leave or not far, working part time, and so I think basically I called and said I'd like to come back to work, and I knew that there was a position in this medical genetics center, or at least the possibility of it, and he made it very clear now I was no longer his fellow and he'd be interested in talking to me, but I had to try to develop my own career now. That was fine. I mean I hadn't really thought about it, but that was what should happen.

***Tacey Ann Rosolowski, PhD***

**0:45:56.2**

So what was going through your mind when you suddenly realized that was the new project—to develop your own career?

***Louise Strong, MD***

**0:46:02.4**

I had some ideas of things that I wanted to follow up on. When I reviewed retinoblastoma records something that completely surprised me that was not part of his paper at all was the fact that many of the patients that had come to MD Anderson with retinoblastoma didn't come here initially for their retinoblastoma treatment. They were treated by an ophthalmologist somewhere else. We didn't always even have much of an Ophthalmology department. We do now, but there were years where we didn't. What they came here for was that, as they were older, they had developed sarcomas or brain tumors or other cancers. To be ten years old and on your second cancer was clearly out of range. There was something else going on here, and so I was just shocked by this because I found it in way too many cases to explain by chance. Now in those days if you had bilateral retinoblastoma, which was the inherited type, probably the most common treatment was to remove the most-involved eye because you might not be able to save any vision out of that, but then nobody wants to enucleate both eyes in a baby, so then they would irradiate the other eye. Well, we really didn't—I mean we knew then that radiation could cause cancer, but we didn't realize that this might be a uniquely susceptible group. One, they were infants; two, we know they have an inherited predisposition, at least to retinoblastoma; and three, they're getting radiation.

***Tacey Ann Rosolowski, PhD***

**0:47:52.2**

Sort of three hits.

***Louise Strong, MD***

**0:47:52.6**

It's only fairly recently that the ophthalmologists had really taken this seriously, but—anyway—recognize that and began addressing the question of risks for new cancers in childhood cancer

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survivors and how much of that might be attributable to genetic predisposition like retinoblastoma and/or radiation or, of course chemotherapy is developing during that period as well. Then that got into programs studying childhood cancer survivors in general, and concerned about—well, in the past maybe childhood cancer patients didn't survive, so if it was going to be familial we would never see it because they didn't grow up and have children, but maybe now that we were having survivors—because in the seventies is when we really made a big, big push in terms of having chemotherapy that changed the picture for childhood cancers, and so thinking are we going to start seeing all these familial childhood cancers to not. So I really got into more of that kind of childhood cancer, [genetic epidemiology](#). I did some work with chromosome analysis. We thought at one time maybe when new techniques in chromosome analysis came out we'd be able to see deletions, and that that would increase your risk of a second cancer, but the deletions were really primarily in kids who also had developmental delays and other things, so you had big chunks of genetic material lost. Then I was involved in the studies that showed that the second hit—well, there were people who showed that the retinoblastoma gene was on this chromosome thirteen, and then the question was, "Okay, what is the second hit?" So I was involved in working with some of the people who showed that the second hit was also from the other chromosome thirteen, so that was fun to be able to be part of that mechanistic approach.

*Tacey Ann Rosolowski, PhD*

**0:50:09.0**

Well, I have a whole—

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*Louise Strong, MD*

**0:50:09.2**

So I collaborated with a lot of different people who had different expertise, because I did some of the cytogenetics early on, but I was really not primarily a laboratory rat, and I was more comfortable doing more of the statistical analyses but I was very interested in what the molecular biology was going to tell us, and so I collaborated closely with people and I would know the patients and collect the samples and we would help plan the experiments, but using people who had talents that I didn't have and then working with them.

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## **Chapter 6**

### **A: The Researcher**

#### ***The Discovery of the p53 Tumor Suppressor Gene***

#### **Story Codes**

- A: The Researcher
- C: Discovery and Success
- A: Overview
- A: Definitions, Explanations, Translations
- C: Professional Practice
- C: The Professional at Work
- C: Collaborations
- D: Understanding Cancer, the History of Science, Cancer Research

***Tacey Ann Rosolowski, PhD***

**0:50:48.1**

I have a list of some the studies that seem to pop out as being really key, and I wonder if maybe you could talk about some of these. One of them was, of course, the work you did on the [p53 gene](#). I don't know what is the right order to talk about these in so if there's something you did prior to that that really needs addressing—

***Louise Strong, MD***

**0:51:14.6**

Some of the work—so my first paper with Al was on Wilms' tumor of the kidney and so it had a lot of analogies to retinoblastoma, and so then I teamed up with [Grady Saunders](#) for a number of years to try to identify the Wilms' tumor gene that was going to be like the retinoblastoma gene, and we did a lot of nice work together, but Wilms' tumor didn't quite work out the way retinoblastoma did. It hasn't been nearly as tidy.

***Tacey Ann Rosolowski, PhD***

**0:51:49.1**

What did you discover?

***Louise Strong, MD***

**0:51:52.3**

I'm just kind of giving you a little background. We didn't actually discover the Wilms' tumor gene. Somebody else beat us to it by a few weeks, but we did a lot of work on showing that it was a two-hit model. It did follow exactly—at the molecular level it followed that same kind of model, but then it turns out that that's true or some Wilms' tumors but not necessarily for all and that some other childhood cancers are much more complicated than retinoblastoma was—

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assuming retinoblastoma was really unbelievably simple compared to perhaps most. We had really a number of good papers. We identified a gene for aniridia, which was related because we knew that there was a small deletion that involved both Wilms' tumor and aniridia and that they had to be separate genes, but there were—it was what was called a [contiguous gene syndrome](#), so there were patients who would have both Wilms' tumor and aniridia because they had a deletion that affected both of these neighboring genes.

*Tacey Ann Rosolowski, PhD*

**0:53:07.4**

What is aniridia? (inaudible, speaking at the same time)

*Louise Strong, MD*

**0:53:08.2**

It's absence of the iris of the eye. It's actually maldevelopment of the iris of the eye. It may not be completely gone, but it's a congenital abnormality. That was important because initially people didn't know whether it was all one gene that caused these things or separate genes, and so all the work that Al and I had done on Wilms' and aniridia and then Grady and I did sort of sorted that out, and then we actually identified the aniridia gene in Grady's lab.

*Tacey Ann Rosolowski, PhD*

**0:53:39.1**

So as you're going along and—I mean I can imagine as you're unraveling the relationships between these different tumors you're also unraveling how the chromosomes operate at a molecular level.

*Louise Strong, MD*

**0:53:54.7**

Right, yes, and I'm very interested in that. It was just that—I don't know, I guess I always felt like a klutz in the lab, so it was—I loved the work and developing some of the hypotheses, identifying cases, getting the samples, and in some cases actually then going back to the patients and being able to give them new information about themselves or their families.

*Tacey Ann Rosolowski, PhD*

**0:54:22.1**

Did that happen in the case of aniridia and the Wilms' tumor?

*Louise Strong, MD*

**0:54:24.9**

Uh-hunh (affirmative).



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*Tacey Ann Rosolowski, PhD*

**0:54:25.6**

It did. So can you tell me a little bit about what information were you able to give a patient about that?

*Louise Strong, MD*

**0:54:35.5**

First of all, it had been known that there could be chromosome abnormalities—I guess that had come out earlier, but we thought it had to be this kind of big, gross thing, and that you could visualize easily. We then found—identified some patients who had Wilms' and aniridia and it wasn't grossly visible, so we were able to prove at the molecular level that the genes were both deleted, and we were able to—the patient and family didn't understand this at all and we were able to kind of sort that out. Then we could go—we could give them risks for having that recur in the next generation and that kind of thing. We could identify those cases of aniridia in which they were at risk for Wilms' and those in which they were not based on the molecular analyses. So those kinds of things. Things that were not clinical tests. In other words, this was done in a research laboratory. Now you're not supposed to tell people research results because it not a [CLIA certified lab](#), but we still do some of that. So all of that was really fun and interesting and then it basically got where I spent more and more of my time with these so-called [Li-Fraumeni syndrome](#) families and, again, here there was a very strong relationship to retinoblastoma.

*Tacey Ann Rosolowski, PhD*

**0:56:23.8**

Could you describe what Li-Fraumeni syndrome is?

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*Louise Strong, MD*

**0:56:27.3**

First of all, Li and Fraumeni were two people—two individuals at the [National Cancer Institute](#) who did lots of surveys of childhood cancers—epidemiologic surveys. They could go to the Bureau of Vital Statistics and review all the records of all the people who had died of Wilms' tumor for example, and in the 1960s pretty much everybody with Wilms' tumor died, so they had a pretty good distribution of what age of onset, whether they were familial or not—some things like that. So one of their surveys was of children with sarcomas. Actually that's not quite right. They were unusual epidemiologists. They were interested not just in the big population things, but they were also interested in things that were just sort of outliers—really unusual events that might be telling you something. So they were referred a family in which there was just all this cancer, and there were cousins that had childhood sarcomas, and childhood sarcomas are not very common, even among childhood cancers, and they have cousins with this, and they had had a lot of other cancers, some of which were unusual—breast cancer in your twenties and maybe early thirties. You know, that's—I mean you're putting all this together in a family, and so they found this one family, and then they kind of began looking around for that and they found a couple of other families. So they wrote up a paper and asked if this was a familial cancer syndrome, and by that they hypothesized it might be viruses. It might be environmental. It might be genetic. They didn't focus on any one possible cause. Of course then people began looking for this clustering of sarcomas and breast cancer and a variety of other tumors. Those papers came out in 1969. So in the early seventies is when I'm looking at childhood cancers—genetics. I thought this was really fascinating and wanted to see if I could reproduce that or if I could do a survey of MD Anderson cases and see is this real. How frequent is it? Could it be genetics? We're beginning to think at least in Wilms' and retinoblastoma there is some evidence for genetics so maybe this is the sarcoma one. Well, then it became apparent that, like retinoblastoma, in Li-Fraumeni patients if you developed lung cancer and were successfully treated you were at high risk of another, and another, and especially in sites where you were treated by radiation. So that was another sort of thing that appealed to my interest that was kind of in a common theme in things that I had been interested in all along. So I set up a study—which one could never do today—to identify all the childhood—I chose soft tissue sarcomas, which are childhood tumors of connected tissue, muscle, that kind of thing, which were mostly what they had seen in this first paper on Li-Fraumeni syndrome. I identified all the patients that had been treated at MD Anderson from 1944 to, I think, sometime in the 1970s and decided that we were going to relocate all of these families and get the family history, and look at risk for second cancers, and hopefully someday do cytogenetics or other molecular genetic studies and see if we found these same kinds of families and how frequent and so forth they were. In those days you didn't have the Internet and all that, but you also didn't have [HIPAA](#) and all the privacy laws, so even though many of the children had died—oh, well, we looked at five-year survivors because I wanted to look at those where there was a risk of a second tumor, not those that just died six weeks after they came in, and I also thought those families—even if their child did die—they would be much easier to locate because we had had several years of

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communication with them. So that was our criteria. Amazingly we had very few people decline. There were a few people that were from out of the country or something we couldn't locate or something, but we found—oh, I don't know—something like ninety-six percent of the eligible—of those who appeared to be eligible and had almost no people decline to give us this detailed family information.

*Tacey Ann Rosolowski, PhD*

**1:01:23.2**

Why do you think it was such a high percentage of—?

*Louise Strong, MD*

**1:01:24.8**

I think because they had had an experience here at MD Anderson that was unique, and they were ready to help any research that might help others with children with cancer. I think it was a factor of I was from their institution and families who have had a child with cancer don't ever forget, and so they were willing to help, but they gave us everybody in the family's name, address, phone number. You know, you can't do that today? So we gathered up all the data and did some statistical analysis and it looked like about five to ten percent of cases came from this kind of familial syndrome. We documented everything they told us with medical records and death certificates. We did have to have authorization for release of information then, but most people were willing to give us that and most hospitals were willing to send us their records or copies of their records. Only Methodist Hospital requested a notarization—an actual notary or something. Anyway, we were able to show that five to ten percent of these patients had families that were consistent with autosomal dominantly-inherited cancer susceptibility, and then we could kind of characterize what were the cancers and so forth and, sure enough, it very much fit the Li-Fraumeni syndrome, but it gave—we tested genetic models and it provided pretty solid data that the subset was due to an autosomal dominantly-inherited gene. We had some that were really big families and so, from a statistical perspective, it was a dominant gene. So then we began collecting samples, and of course not all the people that were statistically in analysis were living and able to give us a sample, but then we started—

*Tacey Ann Rosolowski, PhD*

**1:03:30.7**

What kind of samples were they?

*Louise Strong, MD*

**1:03:32.9**

Blood samples, because by then you could do linkage analysis. You could do a scattering of markers around the genome. It was a pretty low probability when we started, but once you had the sample and you had the DNA you could always go back and use it for better technology or more markers—more dense markers—as that became possible. Again, people were very

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cooperative. A few people refused to give blood, but not too many. So we had all the blood samples, and we were doing markers, and we tested hypotheses. Was it related to the retinoblastoma gene? No. We tried to do this linkage analysis, but we didn't have enough markers in the genome to really be able to come up with anything very clear. Finally, I went to a meeting at [Cold Spring Harbor](#), and there were all these people giving talks that were doing tumor analysis and DNA virus analyses in different systems, and this gene p53 kept coming up, and it seemed to be involved in so many different types of cancer, and it might be kind of like a tumor suppressor gene, and there were so many different ways it could work in cancer, and I decided it had to be p53, but then—I don't have a lab, and so I talked to a couple of people about it, and there was a whole series of different things that happened and things—this was all very political.

***Tacey Ann Rosolowski, PhD***

**1:05:27.2**

How so?

***Louise Strong, MD***

**1:05:28.1**

Okay, so one of the things we had been doing along the way—before I became confident it was p53—but just some of the research we were doing—we said, “Okay, fibroblasts are the closest thing to a tissue representative of the sarcomas, and so we're going to culture fibroblasts and we're going to look at chromosomes in these fibroblasts, and we're going to treat them with cancer-causing agents and see if they behave differently than normal fibroblasts.” To do that we had to get little punch biopsies of skin and grow them up and, again, you could get them at the time somebody was having surgery, and even a little punch—people were—you know, you didn't have to have dozens and dozens of these. So we had these, and the person who was growing these in the lab and going to do all these studies, at one point—well, we saw some chromosomal abnormalities, but one day it was this chromosome and the next day it was a different chromosome in a different culture, and a different chromosome, so one week we were all excited about one chromosome and then another. But at some point—these cells had been in culture for a while, and what happens to normal fibroblasts is at a point they go through senescence. They die if they're not—if they—so called [HeLa cells](#). They die of. Apparently a technician had gone on vacation or something and kind of left these in the incubator, and when he came back there were some really funny-looking cells in there. There were some cells that had gone through senescence like they were expected, and there were some that were really looking funny. They were not senescent, and some of them were growing, and some of them appeared to be possibly transformed or immortalized. Now at this point in time there was no solid basis for normal human fibroblasts ever being immortalized. There had been publications and publications, but it would always turn out they were contaminated with either cancer cells like HeLa cells or they were contaminated with some of the viruses that were in the lab or something—they were always contaminated. So we did lots of different things to prove that they

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were not contaminated, that they were immortalized, and that if you added in a cancer gene—an [oncogene](#)—they would become transformed where you could now inject them into a [nude mouse model](#) and they would make tumors. We could not publish this. Nobody—no matter how much we demonstrated that these were—I mean we had normal DNA from the patient. We showed that the markers that she had were still present in these immortalized cells, et cetera. There was no virus. There was no HeLa. There were none of those things. People just didn't really believe it. Well, there was one person who did believe it. He was in Boston, and he believed it because that's what you would expect if you had a mutation in p53.

*Tacey Ann Rosolowski, PhD*

**1:09:18.8**

Can you name that person?

*Louise Strong, MD*

**1:09:20.2**

Steve Friend. Stephen Friend. So he had two things going at the same time. He was working with [Fred Li](#) on a family that they had where they actually could do linkage analysis and he was working with us on these fibroblasts to see if—he was a p53 guy. He could sequence the p53 gene. He could actually look for specific mutations. He was looking for mutations in this family of Fred's in the normal DNA and he was looking at the immortalized fibroblasts to see if what had happened was we had an inherited mutation and perhaps an acquired mutation that had occurred in this immortalization and that would make sense that you would then add a [RAF](#) to the picture and get a tumor. So all of this happened at the same time.

*Tacey Ann Rosolowski, PhD*

**1:10:19.3**

That's amazing. You mentioned Fred. Who was—?

*Louise Strong, MD*

**1:10:20.2**

Fred Li

*Tacey Ann Rosolowski, PhD*

**1:10:21.3**

Fred Li.

*Louise Strong, MD*

**1:10:21.9**

Li as in Li and Fraumeni.

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*Tacey Ann Rosolowski, PhD*

**1:10:23.1**

Okay. And Fraumeni's first name is?

*Louise Strong, MD*

**1:10:26.3**

[Joseph Fraumeni](#).

*Tacey Ann Rosolowski, PhD*

**1:10:27.8**

I can't even imagine how excited you all were when this all came—

*Louise Strong, MD*

**1:10:31.0**

Oh we all went to Boston to write the paper, to see it. We had a nice weekend in Boston and everybody was so excited but scared to death because this is not something you want to leak out, and then you also—you would wake up nights for—you knew things about people that they didn't know about themselves, and you couldn't start counseling them about it at least until it was all peer reviewed and people believed you, and then we had to set up protocols to be able to provide this information because, of course, you didn't have CLIA labs who could do that. So we had to set up a psychosocial study to measure the impact of this information so we could get IRB approval, but the chills of actually knowing that and then looking at the pedigree of four or five generations of people who died of cancers, it literally still gives me chills today sometimes. It was just really scary to know that at a time when you've just never been in a position to know that much about somebody—somebody's family—or to know how it was going to change their lives—or do they want to know? So it was very exciting. Certainly by far the most dramatic of anything in my scientific career.

*Tacey Ann Rosolowski, PhD*

**1:12:05.9**

You wanted to work with patients and you found something that really had an impact.

*Louise Strong, MD*

**1:12:09.6**

We had an impact, yes. So we've not a lot of that since. Anyway, we got together and wrote, and rewrote, and rewrote the paper and got it published in *Science*, and then, to go back, once that was out, then that paper on the fibroblast was published but nobody thought it was very important anymore because, "Oh well, if it's p53, of course." So that's what I mean, is—you had a really important event that contributed to the identification as p53 as the underlying mutation but you get no credit for it because nobody believed it until you had done the next step, which you didn't know initially.

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***Tacey Ann Rosolowski, PhD***

**1:12:57.1**

What year was the paper published in *Science*?

***Louise Strong, MD***

**1:13:01.8**

1990. So then, you're just overwhelmed. You've got all these samples. You can actually work through all these families and know this person doesn't carry—now we then had a lab here that could work through all the individual samples.

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***Tacey Ann Rosolowski, PhD***

**1:13:29.3**

Tell me—because that kind of surprised me when you said, “Oh I didn’t have a lab.” So what was—how did that happen that you came to have the lab—

***Louise Strong, MD***

**1:13:39.8**

Well, it wasn’t my lab. I was involved in recruiting people in the department of genetics and there were people in molecular genetics who don’t talk to patients. We always had very good collaboration—interactions—and I knew things about the syndromes that they didn’t know or understand and they knew things about some of the genes and certainly some of the technology that I didn’t know so. I’ve been very lucky over the years to have very good collaborators.

***Tacey Ann Rosolowski, PhD***

**1:14:09.8**

Now it was Steve Friend’s laboratory that did all the testing for that first phase of the—

***Louise Strong, MD***

**1:14:16.0**

The first few cases that were in the *Science* paper, his lab did, but then we come back to Houston and I’ve got fifty samples from one family to slog through and ten samples from this family, and we had—I don’t know how many families we had at the time but on the order of twenty-five or more, and multiple samples from each of those. So then we didn’t know, would all of them have p53? Would some of them? Of course—

***Tacey Ann Rosolowski, PhD***

**1:14:49.3**

So you set up a laboratory relationship with people in what departments? Who was working with you at that time?

***Louise Strong, MD***

**1:14:54.7**

Molecular Genetics. Well, for a short time it was someone named [Marc Hansen](#). Much more of the time it has been with [Gigi Lozano](#) in Department of Genetics. The Department of Genetics has changed names several times. It was Genetics. Then it was Molecular Genetics. Then it was Cancer Genetics, and now it’s Genetics again.

***Tacey Ann Rosolowski, PhD***

**1:15:18.0**

Do I need to ask you about that?



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***Louise Strong, MD***

**1:15:20.0**

No, no. It really had very little to do with me. I was just sort of along for the ride. I was the only person in the department who was not a lab-based person and nobody knew quite what to do with me. That's not quite true. There was someone, David Anderson, who was here when I first started in 1968. He had been here since the early sixties I guess, and he was a statistical geneticist. He and I kind of officed together. We never really collaborated very much because he was interested in adult-onset breast cancer. Lots of people in the world were doing studies of breast cancer, and so I totally always stayed away from breast cancer except when it came into this Li-Fraumeni syndrome, which was, in my eyes, a childhood cancer syndrome first and foremost. So he and I shared offices. We shared coffee pots and support staff and all that thing until he retired, and he retired in about—oh, when did he retire—I guess the early nineties.

***Tacey Ann Rosolowski, PhD***

**1:16:41.7**

Now do you identify yourself as a statistical geneticist?

***Louise Strong, MD***

**1:16:45.1**

No, I'm not that strong a statistical person, and the statistics over the last decade or two with software and that kind of thing and the ability to sequence the genome and then trying to deal with that vast amount of data—I mean that's a whole other world. I can do a few statistical tasks, but I'm really not into—statistical genetics is a whole different field than just statistics in general. It's much more specialized.

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## **Chapter 7**

### **A: The Researcher**

#### ***The Next Phase of the p53 Tumor Suppressor Gene Story***

#### **Story Codes**

A: Character, Values, Beliefs, Talents

A: The Leader

A: The Researcher

C: Discovery and Success

A: Overview

A: Definitions, Explanations, Translations

C: Professional Practice

C: The Professional at Work

C: Collaborations

D: Understanding Cancer, the History of Science, Cancer Research

***Tacey Ann Rosolowski, PhD***

**1:17:20.3**

So how do you define your own area of specialization?

***Louise Strong, MD***

**1:17:25.1**

Cancer genetics or genetic epidemiology of cancer because it's kind of epidemiological approaches, but the questions you're asking are genetics as opposed to cigarette smoking or air pollution or something. You're looking for big differences.

***Tacey Ann Rosolowski, PhD***

**1:17:50.3**

You said—I mean I thought it was kind of interesting that you said that nobody knew what to do with you and—

***Louise Strong, MD***

**1:17:56.4**

Oh, it's true. I didn't fit. I didn't fit.

***Tacey Ann Rosolowski, PhD***

**1:18:03.7**

How did you know that? How did you know that nobody knew what to do with you?

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***Louise Strong, MD***

**1:18:06.9**

Oh it was very obvious. I also had an appointment in pediatrics for a while. I joined appointments in pediatrics for a while and that was good because I was really interested in pediatrics. The only reason I don't anymore was when we started a clinical genetics program here, breast cancer was clearly where it had to start because of the [BRCA genes](#), and so it seemed important for me to have a joint appointment in breast, and so pediatrics was not going to—at least immediately—be a big player in the clinical program, so that was moved. Some of those joint appointments are a little bit arbitrary. MD Anderson didn't have a department that really was a fit for me. I certainly didn't belong in a heavy duty statistics department. Initially statistics here was mainly methodology for clinical trials and such. I wanted to be in genetics. I wanted to be around people in genetics. I wanted to be around people who were doing laboratory genetics, too, but we didn't really have a human genetics program. We just never ever have had that. I sort of broke—I broke a lot of rules so—

***Tacey Ann Rosolowski, PhD***

**1:19:48.0**

What do you mean you broke a lot of rules?

***Louise Strong, MD***

**1:19:50.5**

I wasn't—I was in laboratory depts. But I didn't have a lab. I wasn't boarded in anything to be treating patients. You've got people with MD/PhDs who do all of those things. I really didn't do any of them, and so I think one thing that I did that worked well was bringing together teams of people who probably would never have worked together otherwise. So we had the molecular genetics people. We had some statistical genetics people. Sometimes—some years we had cytogenetics people. We had people who did the cell cultures. We brought together people to focus on a human condition, and probably none of those people would have worked on the human condition otherwise because they would have been dealing with experimental animals—not experimental animals, but animal systems or cell cultures or something else.

***Tacey Ann Rosolowski, PhD***

**1:20:51.0**

Now do you see your ability to do that as—I mean certainly it was a natural outgrowth of your own interest in this, but were there some other kind of interpersonal skills that you feel you brought to that that enabled people to work together. I'm thinking down the line we're going to be talking about some of your administrative roles and leadership, so I'm thinking is this how—one way in which your own leadership skills began to show themselves?

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*Louise Strong, MD*

**1:21:20.8**

I think so, because I was able to get grant support for what's called a program project, which are large grants, which is in its twenty-fourth year now and people have come and gone from that.

*Tacey Ann Rosolowski, PhD*

**1:21:37.1**

Is this the mutational model project?

*Louise Strong, MD*

**1:21:38.6**

Yes, that goes back to the early eighties.

*Tacey Ann Rosolowski, PhD*

**1:21:39.6**

Yeah, the mutational model for childhood cancer.

*Louise Strong, MD*

**1:21:45.5**

So people have come and gone. People have died. People have retired. I kind of have been able to recruit people who were interested in these and to be able to have a group that could work together. There are times that people have worked together better than others, but in this way you developed resources—kind of some shared resources—and people working on different aspects of a problem. So for me it's been a very good way to do research. A lot of people wouldn't want to do that. You've got people who have been doing basic things, and sometimes they're really excited to apply it to human genetics.

*Tacey Ann Rosolowski, PhD*

**1:22:42.0**

So you're almost like a relay point between the basic sciences and—

*Louise Strong, MD*

**1:22:47.1**

That's an interesting perspective.

*Tacey Ann Rosolowski, PhD*

**1:22:49.5**

You know you're kind of the translator—kind of getting it—well, I'm thinking of course because the whole idea of translational research and bench to bedside and back again—that's so important to MD Anderson. Because you have this perspective that's kind of in between and a mind that takes in a problem that spans both of them—you're able to do that.

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*Louise Strong, MD*

**1:23:14.4**

Anderson views translational research as treatment to basic science and back. They don't really view it as ideology, underlying predisposition, but that's a little bit arbitrary because what happens once you get a cancer? How you go from being predisposed to getting a cancer does fall into that area. I'm really not what most people around here mean when they talk about a translational researcher. They're talking about understanding the basic science, the biology, the genetic changes in the tumor, using that to identify proteins that could be targeted with drugs that could be candidates for treatment. That's kind of the typical way. It's more the notion of understanding the biology of the tumor and using that information to develop targeted treatments.

*Tacey Ann Rosolowski, PhD*

**1:24:24.0**

That's what MD Anderson says. What do you say? Do you agree?

*Louise Strong, MD*

**1:24:29.1**

I think that's what most people mean by translational research at MD Anderson.

*Tacey Ann Rosolowski, PhD*

**1:24:32.7**

Right, but what I'm saying—do you see yourself doing translational research?

*Louise Strong, MD*

**1:24:37.6'**

If that's the definition then probably not really. I mean it's not—I don't want to be drawing fine lines in the sand at all. It has translational aspects. It's just not kind of the main thing people are talking about when they talk about translational research.

*Tacey Ann Rosolowski, PhD*

**1:24:58.7**

What makes sense to do now? Obviously this discovery of p53 had enormous implications and, sure, spawned a lot of projects. Does it make sense to talk about—to kind of trace that story to its end or do you want to—?

*Louise Strong, MD*

**1:25:14.3**

Oh, it doesn't end.

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***Tacey Ann Rosolowski, PhD***

**1:25:17.5**

Okay, that's exciting.

***Louise Strong, MD***

**1:25:21.5**

We're still following it.

***Tacey Ann Rosolowski, PhD***

**1:25:22.2**

That's exciting. Would you like to follow through on that story? We have about twenty minutes left this morning, and then maybe start with something else next time?

***Louise Strong, MD***

**1:25:30.2**

Sure, that's fine. Well, after that we had to spend a lot of time doing a lot of genotyping and finding out who had what gene or who had changes in the p53 gene and where it was. As with every gene that comes along today, too, you find changes that you don't know whether they're really deleterious or not. Is this just a random variant or is this something that is disease causing? So there's—and that's still ongoing, in terms that we now have well over a hundred families with mutations in p53 and about a hundred and seventy-five that have a similar phenotype, similar cancer distribution and types that do not appear to have alterations in p53, so we're looking to see where they might have genetic changes. We are trying to put together a different team to develop a cancer screening program for these patients. Over the years I've always brought that up to our imaging people and always been told that you cannot—for the tumors we were worried about—brain tumors, bone tumors, sarcomas—that you couldn't image it before it would be causing some kind of symptom. Now imaging has improved a lot in the last few years, too—particularly MRI. CT has improved, too, but it has a lot of—it has a fair amount of radiation associated with it. About a year ago a group in Canada put together a screening program for individuals who carried mutations in this p53 gene, including children and adults, and—of course Canada has a little bit different healthcare system than we do, as you know, but, at any rate, they showed that those—and people could choose to be screened or not, and about half chose to be screened and half chose not to. Nobody knew whether the screening was going to be worthwhile or not. Screening problems always include you're going to find things you don't know what to do with. How many extra procedures are you going to do that turn out to be nothing—or could even be deleterious? How much anxiety are you going to cause? What's the extra cost, et cetera? So nobody knew whether this was really going to work or not. They started this somewhere I guess about mid-2000, and the numbers were small, but with follow up of most of the cases for about five years they were able to show a big difference between those who had been screened and those that had not. Those who had not been screened—I don't believe any of them had survived their cancer. Those who had screened, I think four out of six had. Numbers

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were small. Some of the cancers were like thyroid, which is rarely life-threatening, but some of them were like brain tumors and sarcomas that are most often life-threatening, and there were enough of those to convince me that this was going to be real. There were two or three other spots who have set up programs just early on. I had talked to our imaging people a couple of years ago, and they were interested in doing it but we just really didn't have all the different clinicians. You need pediatrics and adult, medical oncology. You need imaging. The biggest thing we need is money actually because these are not going to be people who are fully insured and that kind of thing, and MRI, of course, is much more expensive. Anyway, now we do have some possibilities. You can't really carry this very far but, the MRI technology has really improved a lot, and the imaging people are very excited about doing this—both those who are doing research MRI as well as those who are doing state-of-the-art clinical MRI. I think we've gotten the clinical people engaged who are interested. That includes breast, adult sarcoma, pediatrics, and pediatric long-term survivor clinic because some of these patients who were successfully treated in the past are potential candidates now to be entered into screening for their—to detect their next cancer. So this is something I really want to try to get going. Texas Children's is just setting it up and will probably be doing the infant cases because they have a lot more expertise and you don't want to publish that in our MD Anderson book, but to be honest, they do. So it's not all in place at all, and the funding—there are a couple of possibilities for funding. The people who are doing the research—the companies that are doing the research in MRI might, we hope, be interested in seeing this application. Grant money is going to be hard. Once you've had a proof of principal in one place it's going to be hard to get research money. Our [CPRIT](#)—the Cancer Prevention—they're only really interested in screening for breast, colon, and—what's the third one—lungs, I think. It might be different than lung. I can't remember. But they only have money set aside for big screening populations for common cancers where you're bringing screening to populations that would not otherwise have access to screening—minority populations, health disparities, that kind of thing. It's possible I haven't found the right person, but I have not found anyone who felt that their screening money was applicable to this situation, although I'm sort of waiting for them to settle down and figure out who is going to take [Alfred] [Al Gilman](#)'s place and those things.

***Tacey Ann Rosolowski, PhD***

**1:32:56.8**

It's really ironic or curious given the fairly recent establishment of a department of cancer prevention here at MD Anderson, and I was curious about your working relationship with Dr. [\[Charles A.\] LaMaistre](#) around those issues and everything that came out of p53 and the implications for prevention. I don't know if you have any—if that connection is worth exploring.

***Louise Strong, MD***

**1:33:26.8**

There really wasn't a lot of interaction with him along those lines. His focus was on lung and smoking and that kind of thing. MD Anderson has gotten to be so big that there probably are

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people doing the same thing in different parts of the institution that don't even know each other, but the prevention program clinically has focused again on standard clinic—excuse me, standard screening for common cancers—mammograms, and there is a high-risk breast screening and there is a high-risk GI screening now for genetic high-risk groups and for some rare endocrine inherited conditions there is a—there's kind of a high-risk protocol, but those can all be done. Those things are done basically—the endocrine one is done through paying for—using your insurance. There's no access if you're not covered in some way or another.

***Tacey Ann Rosolowski, PhD***

**1:34:47.3**

So it really is a matter of money. It's not as though the discoveries that you have made about this particular syndrome have kind of presented a curveball or some unusual issue of prevention that now a big institution with certain habits needs to address.

***Louise Strong, MD***

**1:35:07.5**

Well, I think we have probably the largest collection of p53 mutant families in the country. We have a very large sarcoma service. If you take rare tumors—sarcomas are relatively rare tumors—and tumors of young adults—children, young adults, and some older adults, too—but we have one of the largest sarcoma services in the country—probably the largest. There are reasons of that sort that we really should be interested in taking a leadership role. We have outstanding leadership in, I think—I don't know this field very well—but in MRI—developing new technology and so forth. So there are plenty of reasons it would be worth doing, and for those who are interested in things like chemoprevention and such there might be some opportunities there. Again, that's not a field that I feel like I'm really very knowledgeable in, and it's kind of hard to know when you're dealing with tumors that can occur in so many different parts of the body and so many different cell types it's a little hard to kind of get your arms around.

***Tacey Ann Rosolowski, PhD***

**1:36:28.1**

But I can see how this—it's almost like how do you package this particular syndrome as something that people can understand would be an opportunity to develop new areas of treatment because it—I mean look how long it's taken you to explain it today.

***Louise Strong, MD***

**1:36:51.7**

Hours and hours.

***Tacey Ann Rosolowski, PhD***

**1:36:53.7**



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I mean it's complex and it's almost as if it's a great demonstration of the challenge of cancer and how complicated cancer is.

***Louise Strong, MD***

**1:37:03.8**

The sense is if you can show something really works in this very high-risk population, there are going to be other groups that are not quite as high risk. For example, go back to our old friend the retinoblastoma patients. They're at high risk of sarcomas as well—both bone and soft tissue sarcomas. They would definitely be candidates for this kind of screening. The endocrine people want to use it for some of the endocrine syndromes that they don't have good ways to image—some that are in the chest and abdomen that they need a better look at. So if we could—what it would mean setting up—and this is very do-able—it's done not everywhere, but it's done plenty of other places—is called rapid whole-body MRI. So you need to be able to look at the whole body. You don't want to do the left arm, and then the right arm, and then the left foot, and then the right foot and take a week to get everybody—to get one person imaged. So there's something called rapid whole-body MRI, and you can do the whole body. It's not quite as finely imaged, but you can do the whole body in thirty minutes to an hour depending on all sorts of other variables that you can vary—that you can set different ways. That's something that's not available just anywhere. The cost would be in the thousands. It can be covered by insurance, and some places have—in Utah for example it turns out most everybody in Utah has one health system. I don't know whether it's state health—I don't know how that happened, but at any rate, once they convinced this insurance company to cover it for one person, then they'll cover it for everybody that has this gene mutation, and of course Salt Lake has all the Mormon populations and pedigrees and data base so it's a great place to be doing something like that, but they have convinced that most-common healthcare system to cover the screening. Canada and Europe don't have any problems. It's covered. It's just around the US where there's going to be so much variation in resources that it would be a problem. I mean the argument of course is think what it costs to treat one brain tumor. It's certainly order of magnitude, I mean, in life, but even if you just argue cost alone. So these are a lot of the challenges and this is not probably MD Anderson's highest priority by any stretch at present. This will be a bigger challenge than writing a program project grant for primarily laboratory and genetic epidemiological-based studies, but I need to see some of those things—I would like it see those kinds of things covered before I retire.

***Tacey Ann Rosolowski, PhD***

**1:40:32.1**

Yeah, I mean saving the human cost—

***Louise Strong, MD***

**1:40:36.4**

Excessive.

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*Tacey Ann Rosolowski, PhD*

**1:40:39.7**

Well, shall we stop for today? It's almost—

*Louise Strong, MD*

**1:40:41.9**

Sure. Yes.

*Tacey Ann Rosolowski, PhD*

**1:40:43.5**

It's about four minutes of twelve and I'm turning off the recorder.

**1:40:46.7** (End of Audio Session One)

## **Louise Strong, MD**

Interview Session 2—August 10, 2012

### **Chapter 00B** **Interview Identifier**

*Tacey Ann. Rosolowski, PhD*

**0:00:03.6**

This is Tacey Ann Rosolowski, PhD, and I am sitting in the department of genetics with Dr. Louise Strong. This is our second interview session. Today is August 10<sup>th</sup> and the time is about 10:10. Thank you for giving me this time for this second session.

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## **Segment 8**

### **B: Building the Institution**

#### ***Creating a Cancer Screening Program***

##### **Story Codes**

D: Understanding Cancer, the History of Science, Cancer Research

D: The History of Health Care, Patient Care

C: Patients

C: Cancer and Disease

C: Discovery and Success

A: Overview

A: Definitions, Explanations, Translations

C: Professional Practice

C: The Professional at Work

D: Business of Research

D: Fiscal Realities in Healthcare

***Tacey Ann. Rosolowski, PhD***

**0:00:03.6 +**

We ended up last time with you talking about the screening program for the Li-Fraumeni patients, and I was wondering if you would tell me a bit more about the screening program as you visualize it and as you would like to see it implemented.

***Louise Strong, MD***

**0:00:44.9**

Sure, I'd be glad to. One of the frustrating things about Li-Fraumeni syndrome had been that you could offer testing and identify individuals who carried these genetic mutations but then we had very little to offer them in terms of early detection or prevention, so a lot of people would choose not to have that information since there wasn't any action medically that would be useful, and it was particularly frustrating when you were talking about children because there are some very lethal tumors that can occur in children, and we generally did not test children because the kind of guidelines in genetics have always been that you don't test children unless there's something you can do to treat or relieve or prevent the downstream consequences because you want to allow them to have the right to decide for themselves when they're older, unless there's an actionable item while they're young, and then it's perfectly appropriate for parents to make that decision.

***Tacey Ann Rosolowski, PhD***

**0:01:56.4**

Was that an MD Anderson policy or a general—?

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***Louise Strong, MD***

**0:01:57.5**

No this was a general genetics consensus almost internationally and not just about cancer, but about genetic diseases in general. It's just been a consensus since there was any kind of genetic testing that could be offered—sort of a genetics ethics guideline. Now about a year ago there was a study published from Canada in which a rather intense screening program was developed and it was offered to families that carried these p53 germ line mutations and some chose to participate and some chose not to, and then after a period of five or six years they looked at the outcomes of those who had had this taken—the screening—and those who had not, and in both cases new cancers had occurred. In those who had not had screening basically everyone had died, and in those who had undergone screening no one had died. It was a small study—a short follow-up. It was Canada. Some of the tumors in the screened group were tumors that might never have become aggressive, life-threatening tumors, so it clearly needs more follow up and information, but it was the first example of significant comprehensive screening that made any difference. Now a couple of other groups have initiated such screening, and we're talking about it here as well. Some of the issues have to do with, is this now the new standard of care until proven otherwise—in which case then patients just get charged for the services, or should this be a protocol or a clinical trial where we're asking the question, "Does this make a difference?" We know not everybody is going to participate just because basically not everyone chooses to do that so we would have a comparison group, or should it be a clinical trial where we randomize people there are lots of different kinds of choices, but right now, because of the cost of the exams and the limited funding available it's being set up as just a—as if it were standard of care, even though we don't really know that, and it's intense. The Canada test was every three to four months. It was what's called rapid whole-body MRI, plus brain MRI, plus a series of blood studies and breast MRI and ultrasound if there was some other particular indication. So this is pretty intense.

***Tacey Ann Rosolowski, PhD***

**0:05:35.3**

And this is every three or four months?

***Louise Strong, MD***

**0:05:35.8**

Yes, from age one until—basically and presumably for the rest of your life. So there are lots of concerns about that. With screening we always know we can find things that aren't really important or life-threatening. There is always the issue of what do you do when you find something abnormal. How far do you pursue it? How many extra biopsies or surgeries or other treatments do you end up doing? How much additional anxiety—all those issues with screening, and when you're doing total body screening like this there are definitely going to be more of those, and there will be additional costs because of that in addition to all the MRI, et cetera, costs. On the other hand, in the few places that have done it in the US, there has been pretty

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good response from insurance after educating them with respect to the cancer risk and the cost of the cancer treatment.

***Tacey Ann Rosolowski, PhD***

**0:06:43.6**

You mentioned the Utah?

***Louise Strong, MD***

**0:06:45.0**

Utah, uh-hunh (affirmative). [University of Michigan](#) I think has offered it. There is opening a study at the National Cancer Institute that is a research study. This week I know they had only examined two individuals, but for them it was at no cost, and they even paid your transportation to go to Bethesda and stay there for a couple of days and all that. I think that's the ideal way to do it, but that would require a lot of funding around the country as opposed to just funding at the NCI. At any rate, I think we're exploring this. We have some unique research MRI technology here at MD Anderson that I hope can be utilized because it's even more—gives you better visualization than the current standard of practice.

***Tacey Ann Rosolowski, PhD***

**0:07:49.9**

What is that technology?

***Louise Strong, MD***

**0:07:53.1**

I can't really tell you. I'm only told by those who are—I don't know how they refine it, how that differs from what's being done as standard, but I'm told that they can do a much better job than what has been done in the published paper to date. At any rate, this is just something I think is very important to get out there to the patients who carry this—families who carry these mutations—and to make sure that they're aware of it so that they can make the most informed decisions for themselves, for their children, for their relatives to be sure that everyone has the best, most current information possible and that we offer them the best clinical options for reducing not only cancer risk, but death from cancer risk and, importantly, that we reduce their exposure to the cancer-causing therapies that are otherwise used to treat cancer—the chemotherapy and radiation, which have the long-term effects of increasing cancer risk, and they don't need anything to be added to their burden of cancer risk down the line. So I think that's one of the most important programs that I hope to see implemented within the next year or so.

***Tacey Ann Rosolowski, PhD***

**0:09:23.8**

Is there—can you outline to me the implementation plan that you've been discussing?

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***Louise Strong, MD***

**0:09:31.3**

At present the biggest issue is money. How are we going to pay for it? There is actually—I mean to get into tedious details—there is no CPT code, which is the code recognized by insurance, for rapid whole-body MRI, and there is a code that is sort of MRI, not otherwise specified that has been used, which, with a lot of education of insurance companies, is sometimes covered, but there is no guarantee, and companies, of course, vary. So that makes it difficult to think of doing it as standard of care where you're then hoping that insurance, or Medicare, or Medicaid, or [CHIP](#) programs will fund it. If you don't have a way to fund it through patient care then you need large amounts of money and, I think we had mentioned before that, for example our Texas CPRIT program starts out with cancer prevention in the wording is only at present funding prevention screening in cases where it is standard of care where it is breast, GI, cervix—I believe those are the only three—and for populations that do not otherwise have access—have not had access to screening. We have not been able to get them interested in funding something like this.

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***Tacey Ann Rosolowski, PhD***

**0:11:10.1**

Can I ask you—you mentioned educating the insurance companies. How would one go about doing that?

***Louise Strong, MD***

**0:11:16.6**

Traditionally we frequently have to write letters of medical necessity to an insurance company. Li-Fraumeni syndrome isn't even recognized by most clinicians—even those in cancer. If you then go several steps further back in terms of education you're dealing with insurance companies, and this is just not on everybody's front page. The hope is that if you educate them to the risk of cancer, the cost of cancer if it isn't detected early, the lifetime risks that they would be better informed to make a decision about whether it's in their best interest to pay for these screening studies. So that's all I know.

***Tacey Ann Rosolowski, PhD***

**0:12:05.6**

I just was curious about how you would go about that process.

***Louise Strong, MD***

**0:12:10.3**

I think that we've all written letters of medical necessity just to pay for genetic testing. Now some companies have guidelines. Some still just look at it on a case by case basis. But I think it is a long-term education, and it's more than just writing a letter. I think it's talking to them. It's giving them a bigger picture of what the difference can make in paying for the screening now as opposed to the cost later, and I think that's more than just writing a single letter. I think if the opportunity is there talking to someone face to face, or on the phone, or something directly as opposed to writing a piece of paper, sending a letter is the way to go.

***Tacey Ann Rosolowski, PhD***

**0:13:09.7**

Is there anything else you wanted to say about the screening program as you envision it?

***Louise Strong, MD***

**0:13:15.2**

I think we have to be honest that a program as intense as the Canada program may be difficult to maintain. People get burnout from doing lots and lots of screening when nothing shows up. There are especially risks with respect to the very young children where you might have to anesthetize them to do an MRI, and I think some of these things would just have to be played out—have to see what works and what doesn't, and that's why I think it would be much more important to have it set up from the beginning as a clinical protocol where several institutions all agree to either do the same thing or have stated differences so that we get enough data at the end



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of the day to see what works and what doesn't. Otherwise I'm afraid we'd just get kind of a mix of things—that each institution ends up going along with what the patients will tolerate, and we don't get as complete answers as we would if it were a trial.

*Tacey Ann Rosolowski, PhD*

**0:14:34.6**

Are you talking to any other institutions at this point?

*Louise Strong, MD*

**0:14:37.3**

Oh yes, we've got actually an international consortium and we have conference calls every couple of months and we learn what each other are doing but, as I mentioned, in most places it's being done where patients are required to pay for it, and it's not being done as a standard trial.

*Tacey Ann Rosolowski, PhD*

**0:15:00.3**

What are the other institutions involved in this informal consortium?

*Louise Strong, MD*

**0:15:05.5**

Well, we mentioned Utah and University of Michigan. [Dana-Farber](#) in Boston and Stanford, [City of Hope](#) out in California. I think [Texas Children's Hospital](#), [Baylor](#) nearby is—I don't know that they're part of the overall—of the consortium, but they've always had a very active genetics program and they're starting to offer this. I'm sure there are a number of others that I am not thinking of off the top of my head, but it's a number of those who have had genetic testing program—Penn—Penn would be another—I'm trying to think. I can't remember if there's anyone from Hopkins, but places that have had major cancer genetics programs are apt to at least be following this if not actively offering these options. You have to have the imaging people who are willing to do it because rapid whole-body MRI is not something that's—as I said, there's no CPT code for it, so this is not something that is traditionally offered for routine evaluations, but if we're going to have to screen the whole body we have to figure out a way to do it that doesn't take a week to do each body part.

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## **Chapter 9**

### **A: The Researcher**

#### ***An Ongoing Survivorship Study and Related Research***

##### **Story Codes**

A: The Researcher

D: Understanding Cancer, the History of Science, Cancer Research

D: The History of Health Care, Patient Care

C: Patients

C: Cancer and Disease

C: Discovery and Success

A: Overview

A: Definitions, Explanations, Translations

C: Professional Practice

C: The Professional at Work

D: Women and Diverse Populations

##### ***Tacey Ann Rosolowski, PhD***

**0:16:43.5**

Well, thank you for that overview. Now I'd like to ask you about something that is certainly very related, which is the number of studies that you've been doing on the inter-relationships of different childhood cancers and, as I was going through the literature I was—literature meaning your background—on your research history—I was noticing several phrases that were used for the types of studies you were doing and one is the mutational model for childhood cancer, and I was wondering if you could explain to me what that was and how that evolved into a study of survivorship.

##### ***Louise Strong, MD***

**0:17:30.6**

It started out as we discussed, the two-hit model, working with Al Knudson at the beginning, and the question of how generalizable was that? Besides the notion of the two hits and that's how you could account for the hereditary versus sporadic cancers when at the end point the cancer looked very much the same but some people were getting it much earlier and were getting it because of an inherited predisposition and others were just getting it sort of randomly. So that was one aspect of the model, that it actually could account for how those things happened, but it also raised the question of if these are mutations, and if some individuals already carry a predisposing mutation, then mutagenic events—exposures—would be much more hazardous or likely to cause cancer in that group that was predisposed, and that was certainly documented in looking at the effects, for example, of radiation and probably chemotherapy in the group that started out with a heritable predisposition and that would include—the best documented examples would be hereditary retinoblastoma, in which there's quite a high risk of another

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cancer over time, and particularly in those who had radiation, and our Li-Fraumeni syndrome patients. It's not as well documented for other syndromes, but those are the syndromes that I've mostly worked on, so it may be a question of how much it has been looked for elsewhere, but it raises the concerns not only about cancer treatment, but even about screening. CT scans are widely used both in follow-up of patients who have had a cancer to look for evidence of recurrence and widely used in cancer and other kinds of screening, and it may be that there are some individuals for whom that's really not such a good idea.

*Tacey Ann Rosolowski, PhD*

**0:19:45.0**

Are there other—what's the array of, as you refer to them, mutagenic events—in other words, putting these individuals in some kind of environmental situation that would trigger perhaps something?

*Louise Strong, MD*

**0:20:04.6**

Cigarette smoking. You look at the Li-Fraumeni and the retinoblastoma patients and those who smoke have a higher risk of lung cancer than those who don't smoke. I mean, not surprising, but their lung cancers occur at earlier ages and so forth. UV exposure. Melanoma is a cancer risk in both of those groups and, again, you see risk factors for sun exposure. We have one family with heritable retinoblastoma who have a subset of the family that's in Australia, and they virtually all have melanomas as well as the retinoblastoma. We don't have a really great knowledge of what causes most random cancers, and we don't have an ability to document everything that happens to people, but those are just examples that document the model that those with a genetic predisposition are at greater risk. They're at risk for the same kinds of carcinogens that we know of in the general population, but they're just at higher risk of the exposures leading to a new cancer.

*Tacey Ann Rosolowski, PhD*

**0:21:27.6**

Tell me how this study evolved. So it began, really, in the 1970s, when you first started working with Dr. Knudson, and then how, as you moved into being a full-time faculty person here at MD Anderson and continued in your role in the department of genetics—I mean how did you expand this study? How did it—because this is also the study that was very heavily supported by the NIH. Isn't that correct?

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***Louise Strong, MD***

**0:21:58.2**

Right, right, right. Well, a couple of things. First of all childhood cancers were becoming much more successfully treated and it became obvious we were going to have more survivors, and so I had several sort of different interests in that group. Number one was this question of risk for second cancers. Was it going to be much higher in the subgroup who started out with a genetic predisposition? Number two, in the past retinoblastoma was really almost the only childhood cancer where we had had a large number of survivors of a heritable subgroup, and we knew that they could transmit the gene in a very predictable way. Once we had survivors of Wilms' tumor, and childhood sarcomas, and childhood brain tumors, and you name it for other childhood cancers were we going to see similar patterns of people that we didn't know carried a genetic predisposition who would now be having children who would develop the same cancer? It turns out that the genetic subgroup is not nearly as large for most of those other childhood cancers as it is for retinoblastoma, so the risk of just a childhood cancer survivor having a child with cancer is not very high, but there are a few markers such as bilateral tumors and multiple primary tumors in the survivor themselves that help to identify those who do carry a heritable predisposition and who may be at highest risk for having a child with cancer. So this model has played out for many of the childhood cancers in that way. We have also seen that childhood cancer survivors were generally—to become survivors—most often treated with radiation and chemotherapy, and young age at exposure is another risk factor—independent of whether you had a genetic predisposition. Overall, there's an increased risk. Even if you're not one of the more rare genetic predisposed children there is, again, a high risk of second cancers, and we're still, to some extent, trying to assess how much of that risk is attributable to genetic predisposition, but it's very clear that radiation and chemotherapy independently play a risk—or account for a lot of the increased risk. Having started out studying childhood cancers and wanting to see how much of it was genetic, because we really had no idea at the beginning, it's been very natural to follow these other issues that have to do with genetics of a different sort such as fertility, reproductive outcomes, and risks of second cancers. So we've just had—you know, childhood cancers are relatively rare, so even at a place like Anderson, if you wanted to study very many cases you either collaborated with a lot of other institutions or you tried to study all of the cases that had ever been treated at your institution, whether you're talking about the 1940s or 1950s or the new patients that walk in the door. I've been involved in some of all of that. We've had studies of all the families of Wilms' tumor patients, of soft tissue sarcomas, of bone sarcomas, of brain tumors to try to identify how many came from families that suggested any sort of heritable syndrome. I've also been a participant from the beginning of the childhood cancer survivor study that has been led by [Leslie L.] [Les Robison](#) and includes about twenty different institutions around the US that have significant-sized childhood cancer programs, and that study started in the—I guess it was initially funded at about the mid 1990s and is continuing to the present time. It's sort of interesting because we started out studying patients from diagnosis in the seventies and eighties. We're still following those who are now in their forties and fifties and so forth, but there is a question about whether their treatment is now relevant because it's changed a lot. So we're now

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also starting a newer cohort of patients treated somewhat more recently, but of course they haven't reached the same—they haven't attained the same age. They're still much younger so—

***Tacey Ann Rosolowski, PhD***

**0:27:25.5**

How about the groups?

***Louise Strong, MD***

**0:27:27.1**

Contribute to basically new information, but at some point money may run out to continue to be establishing new cohorts. These studies include extremely detailed information about the treatment, the radiation, the chemotherapy by drug, by dose, the radiation to various parts of the body—not just the site where the tumor was, but how much did it reach the ovaries or the testicles or the thyroid gland or whatever. So these are very expensive studies to do, and in today's current time it's difficult to obtain all the funding that would permit the kind of detail that we've tried to do in the past.

***Tacey Ann Rosolowski, PhD***

**0:28:24.3**

I wanted to ask you about the previous study we were talking about, which is the mutational model, and that had a lot of funding by the NIH from the very beginning. When did the NIH start funding that study and how much did you receive for that—or have you received for that study?

***Louise Strong, MD***

**0:28:44.9**

Well, it grew. It started out small. It started as what's called an [R01](#), which is just an individual investigator grant, but we had two or three people working together. Then we put together a program project and initially it was funded for three years, which is kind of, "Let's see how you do." But we had several projects, and then we just kept on renewing it. The last few years it's been at about two million dollars of direct costs a year, but that's with several projects and what we call cores that provide resources to several projects, so that includes things like collecting blood samples, establishing cell lines, extracting DNA, doing service-type functions that several different projects then use. That makes it more efficient than everybody setting up to do each one of those things by themselves. I think it's been somewhat unique. There were not a lot of people studying childhood cancers or genetics in cancer when we started. Now of course everything has really moved into the genomics era, and so we're trying to do that, too. So it really has represented, starting out, literally counting cancer in families and doing statistical modeling to ask whether these familial—whether these patterns of cancer in families were basically what you'd expect by chance or did they suggest something genetic and, if they suggested genetic, what sort of genetic model did they suggest. How high was the cancer risk if it was attributable to a single gene—all the kind of statistical modeling. Once we had the statistical modeling that suggested there was indeed a dominant gene in the sarcoma families—Li-Fraumeni eventually—

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then we were able to get money for genetic studies at the level of genetic linkage and, ultimately, identifying the genes involved. So it went from literally just counting cancers in families and doing that kind of analysis to gene hunting and now trying to do genomic analysis to identify other genes that might be involved, so that's the way it has grown. Each new technology is more expensive than the last.

***Tacey Ann Rosolowski, PhD***

**0:31:31.8**

Now with the survivorship study, you said that it may very well work out that since those are very expensive studies to run, there may not be funding for them.

***Louise Strong, MD***

**0:31:41.7**

They are funded now. They're funded for at least the next five years. Again, it's not as much money as it could have used, but they're fairly well set. The NCI has recognized that this one big childhood cancer survivor study is unique, and there is a survivorship program at the NCI, and it does work closely with the NCI, but it is being funded and we are now getting into the first real genetic analyses of the survivors, and that will be a long-time ongoing study I think because you can look at these genetic variants for second cancers, for cardiac disease, for obesity, for all kinds of things that are not only limited to cancer, but that have occurred as late effects as part of treatment and in part for whatever other reason but, again, it's likely that not everybody is at equal risk given the same exposure, and so this will provide a resource of—as I said, I think there are about twenty thousand patients to conduct some of these genome-wide studies.

***Tacey Ann Rosolowski, PhD***

**0:33:06.4**

I was asking because I was alerted when you said that they're expensive studies and the money might run out, so I was wondering what your impression is of how, in this era where there is more and more competition for resources—shrinking resources—I mean these are—this is a different kind of study. You're not looking for the magic bullet drug or magic bullet—this is really almost in the area of prevention.

***Louise Strong, MD***

**0:33:34.2**

Yes, it is. It is. That's part of its justification.

***Tacey Ann Rosolowski, PhD***

**0:33:38.1**

So how much commitment is there on the part of funding agencies or funding institutions to support this kind of work?

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***Louise Strong, MD***

**0:33:49.5**

There is a focus on this. Now the NCI a few years ago made survivorship a focused area so there is money that is specifically set aside for survivorship programs, so it's not directly hands-on competing with the moonshot bullet programs or the identifying the next major gene intervention program or whatever. Now as the whole budget shrinks then of course funds come out of every pocket, so in that sense there is competition, I think at the NCI level, survivorship has been recognized as a priority and that sets priorities at least for the cancer centers because to renew your cancer center grant you have to comply with certain conditions and prevention is one of those and survivorship fits in prevention, and so that encourages everyone to be sure that that arm continues. Again, it's not the wealthiest part of the program probably but it is certainly an ongoing, recognized program.

***Tacey Ann Rosolowski, PhD***

**0:35:22.2**

I wanted to ask you also about the clinical cancer genetics program which got established in the 1990s, and if you could tell me how that came about and what it's involved in right now.

***Louise Strong, MD***

**0:35:33.8**

It came about basically with the identification of the BRCA1 and two breast cancer susceptibility genes. They got so much press. There was so much written about them. There had been so much buildup to identifying those genes. *Newsweek*, *Time*, *Ladies Home Journal*, every imaginable news and women's issue or journal had had articles about the race to identify the genes, what it would mean, tragic stories about families in which there had been breast cancer or breast and ovarian cancer over several generations. So when those genes were identified it was a huge media event and in both directions. There were people who thought this was wonderful. "I want to be tested." There were people who thought this was going to be the next stigmatization tool used against women. It's when really all the discussion about genetic testing for cancer susceptibility, about who should be tested, when they should be tested, insurance issues, genetic discrimination. A huge amount of attention arose based on the identification of those two genes, and they were identified in 1994. Cancer centers were talking about what to do about it because their breast cancer patients were coming in and saying, "I want to be tested" or "I don't want to be tested." and there were certainly plenty of families who had multiple cases of breast cancer and young-onset breast cancer. It's the cancer for which we have the best family data. Women are very aware of their family history of breast cancer. They may not know anything about their family history of any other cancer but they know about the family history of breast cancer. It's the most reliably reported. It was definitely the place to start—where we had the best starting point with the best information to move forward.



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## **Chapter 10**

### **A: The Administrator**

#### ***Establishing a Clinical Cancer Genetics Program***

##### **Story Codes**

D: Understanding Cancer, the History of Science, Cancer Research

D: The History of Health Care, Patient Care

B: MD Anderson History

B: Institutional Processes

C: Professional Practice

C: The Professional at Work

C: Offering Care, Compassion, Help

C: Patients

C: Cancer and Disease

B: Building/Transforming the Institution

B: Critical Perspectives on MD Anderson

##### ***Tacey Ann Rosolowski, PhD***

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*Tacey Ann Rosolowski, PhD*

**0:37:58.9**

Can I ask you just for a second, what happened at MD Anderson in 1994 as a result of that? What do you recall here?

*Louise Strong, MD*

**0:38:06.8**

Nothing happened just immediately. People had to figure out how to do it. We were not doing the testing. They're both very, very large genes that were not easy to test, and for a good while we knew a lot of the mutations were going to be missed, so one of the groups had identified the BRCA1 gene initially—the first ones to identify it ended up setting up a company called [Myriad Genetics](#) and offering testing as a commercial offer. We had had genetic research studies. My colleague David Anderson had been studying breast cancer in families for decades, so we had many well-documented families that were candidates for this testing. We did not rush into setting up a clinical program. Again, this requires a lot of collaboration between different groups who don't necessarily talk to each other very much. You have to set up criteria. You had to know what it was going to cost. It took a while before insurance was covering it, and there was a big concern about discrimination. That was huge. Some of the first people who had testing did it under the name of Mickey Mouse or some anonymous name. Initially the information was not put in the medical records. This created a real conflict between the genetic testing group and the clinicians. They said, "We sent you our patient because we want to know." and we said, "They don't want you to know. We can't tell you." It just took years to sort through all these things. So a big part of the delays had to do with fear of discrimination.

*Tacey Ann Rosolowski, PhD*

**0:40:03.6**

Was there some kind of official committee set up at MD Anderson to deal with these issues—or was it sort of informal conversations?

*Louise Strong, MD*

**0:40:12.6**

To some extent, yes, by about 1996 or 1997. There were several of us who convinced our powers that were at the time that we really needed to do something and got together and sort of set up a program for clinical genetics for counseling, for testing. As I say, initially, for several years, this information was kept in charts that were in locked files, and the information was given to the patient. The patient could give it to their physicians, so that was fine, but we couldn't as a—you know the way you would typically document things in a medical record, we didn't so it. It was an awkward situation. Some of the patients didn't want their physicians to know, which was really not a very smart thing to do, but there was so much fear about insurance discrimination for

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a while that that was the way it was handled most places. Then some people began putting it in the record, and gradually more and more states had laws about genetic discrimination. Finally, in the past year or so we have federal legislation, but for a while it was patchwork. One sister could be in a state where there was one law and another sister was in a state where there was a whole different law, and there was concern about employment discrimination. I can remember ethics conferences popping up everywhere about it. There was just really a lot of fear, and the rules—the laws—were not all that clear. So that sort of kept it from really moving into the central marketplace for a while. The other thing was it became apparent fairly early on that there were specific mutations that were relatively common in the Jewish community. There are many other genetic diseases that are unusually common in the Jewish community simply because of the—any community that has cultural, or geographic, or so forth somewhat isolation that happens, but it became, again, a big fear in the Jewish community that this was going to be another form—another ability to discriminate against the Jewish women. So for a long time they were a group that was very much against genetic testing for these genes. So there were just—there were lots of plusses and minuses, and we were not among the leaders in the field. We did not jump into it early on, but finally there was just so much patient demand—there were a lot of patients that did want to know, and did want to be tested, and did want their daughters to know or their sisters to know—have better information than they did, and did want to have screening, did want to be proactive. So at the national level you had these competing leaders—lawyers—women who were lawyers who got involved.

***Tacey Ann Rosolowski, PhD***

**0:43:56.8**

I wanted to ask you, you said that a group of you got together and spoke to people in the administration. Who were the other individuals that were part of that group who could have advocated—or began to raise the discussion about what to do in this situation?

***Louise Strong, MD***

**0:44:14.0**

They were people in—most of us were largely I guess in research—or at least came from a research background, but people from statistical genetics who were well aware of the background of a dominant gene, people who were in gynecology and breast—in other words involved in breast and ovarian cancer genetics and research. Let me think—oh well, an important group—the psychosocial research group—very much concerned about psychosocial impact and how to measure that and what did we need to do about that. Let's see, who else?

***Tacey Ann Rosolowski, PhD***

**0:45:13.4**

Do you remember specific individuals who were involved in at that time?

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*Louise Strong, MD*

**0:45:16.3**

Oh, sure. Someone named [Chris \[Christopher\] Amos](#), statistical genetics. [Gordon Mills](#), who was a gynecology clinician in research. Let's see, [Susan Peterson](#) with psychosocial—a behavioral science person. We had a bigger group than that. I'm just sort of blanking. Then, what we also did was get together with people at Baylor and so we had a group that met fairly regularly and had case discussions and discussed the different cases and what we were doing. Baylor had gotten into this earlier. They had always had a strong medical genetics program and they got into this area much earlier than we did. MD Anderson had never had genetic counselors so we didn't have an infrastructure for this to start with like, for example, Baylor did. Anyway, we finally got the institution to hire a genetic counselor and we set up a program. We were over in what was then the prevention area. We were in kind of a little isolated series of rooms, and we had a counselor, an administrative person, and then gradually we hired more and more counselors.

*Tacey Ann Rosolowski, PhD*

**0:47:13.8**

What was the process of getting that to happen? I mean [John Mendelsohn](#) [Oral History Interview] would have been president of the institution at that time. So did your group get together and have conversations with him? How did you educate the administration about the need for this at the time? What was that conversation about?

*Louise Strong, MD*

**0:47:31.5**

I guess there were two somewhat independent directions. Gordon Mills worked for [\[Robert\] Bob Bast](#) [Oral History Interview], and talked to him about it. Of course Bob had a gynecology background and so he could appreciate the concerns about ovarian cancer.

*Tacey Ann Rosolowski, PhD*

**0:47:55.2**

I'm sorry; remind me, Bob Bast's position?

*Louise Strong, MD*

**0:47:57.9**

He's currently—at the time he was head of the Division of Cancer Medicine. I talked—I went through the more basic research background and talked to [\[Frederick\] Fred Becker](#) [Oral History Interview] who was the vice president for research or for basic research at the time. I think it was becoming apparent that women wanted this, and they were going to go wherever they had to go to get it. The other thing, I'm sure from the clinical side and breast, they were getting asked about it, and we knew some of our patients had gone over to Baylor to have testing and so that was really part of the—simply marketing need to offer this service. There were a lot of young women with breast cancer who were demanding this.

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***Tacey Ann Rosolowski, PhD***

**0:49:00.5**

It's a really interesting response to market pressure. I mean that's sort of the really interesting thing about these medical conversations—that on the one hand it's the right thing to do, and on the other hand it's the savvy thing to do financially, for competition and market share basically. What were your conversations with Fred Becker like? Was he on board from the beginning? How did you have to convince him?

***Louise Strong, MD***

**0:49:28.9**

I don't know. It took him a while—actually, initially, before the people that I mentioned to you, several of us who were in the more basic science or who had been in the graduate school around medical sciences where there was a human and molecular genetics program. This included a person who trained genetic counselors over at the medical school who had been a genetic counselor who then got a PhD and had worked at Anderson for a little while and then moved over there—[Jacqueline] Jackie Hecht. She's now, I think, an associate dean at the medical school. We got together with her because she knew genetic counseling. Several of the researchers here at Andersen; Michael Siciliano, who did more basic genetics. People who were here then—Marc Hansen, who is no longer here, who was a molecular geneticist; cytogenetics people. All of us from research got together and said what would it take. Jackie Hecht was a big help because we didn't really know what it took to set up a clinical genetics program, and she had that running over at the medical school. So we put together a proposal and every year we dust it off and send it up again. That had really predated BRCA, but not by too much, and so once we had BRCA then there was all the hoopla about that, but there was also much more of a marketing issue than there ever was before. Eventually I was really pushing Pediatrics to do it. [Archie Bleyer](#) was the head of pediatrics at the time. He was reasonably supportive of it. So we used all those things and then got more clinical people involved, and it really obviously took getting clinical people involved to make it happen.

***Tacey Ann Rosolowski, PhD***

**0:51:46.9**

It was officially set up in—so the clinical cancer genetics program was set up when in the 1990s—beginning, middle, late?

***Louise Strong, MD***

**0:51:55.8**

I would guess around 1997. That's a guess.

***Tacey Ann Rosolowski, PhD***

**0:51:58.4**

So fairly late. You said it started with one genetic counselor and then grew?

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***Louise Strong, MD***

**0:52:06.1**

Grew. Sure. So Gordon Mills and I were initially co-directors.

***Tacey Ann Rosolowski, PhD***

**0:52:13.9**

What were your goals for that when you set it up? What was your plan to grow that program?

***Louise Strong, MD***

**0:52:22.7**

Initially of course the big demand was in breast, but Gordon and I both really wanted to see a more universal program but it was nice that during those years—1994 and 1995—colorectal cancer susceptibility genes were identified and there had—in addition to the breast cancer studies with Dave Anderson that I had mentioned, there had also been studies of colorectal cancer families and [Patrick Lynch](#) had been involved in some of those so there were hereditary syndromes there. We sort of mapped out known hereditary syndromes that would be reasonable to refer to this clinic but, honestly, breast was by far the dominant one for a long—it is today. It's still two-thirds of the cases. At that point it was probably eighty-five percent of the cases if not higher because the clinicians were really in tune to it because their patients came in talking about it, but our goal was to have a clinical genetics program that would eventually be possibly a department with a number of faculty members. That plan did not—there were several plans that kind of turned over over a period of years. That plan, over the long run, by the early 2000s—or maybe mid 2000s—probably mid 2000s—it became clear that really the genetic counselors probably would be more effective within departments, rather than having their own—having a unit that was all clinical genetics.

***Tacey Ann Rosolowski, PhD***

**0:54:29.9**

Why was that?

***Louise Strong, MD***

**0:54:30.9**

They worked as a team with the research nurse and the clinician and so they worked well with one or two clinicians and they really got where everybody knew them and knew what they did, so they weren't just coming in kind of from nowhere. They were a part of the team. They went to the department meetings. They went to the tumor boards, but that meant they didn't know everything. They just knew breast, or they just knew GYN, or they just knew GI or something. But that has worked very well. They have become very well integrated into the departments. The only down side of it is that we don't have enough counselors for all departments, so some of the clinical departments refer to a more general group of counselors and they kind of see everything, but the beauty of having the counselors within the department was it just increases everybody's awareness of genetics, and the departments that don't have counselors in them never think about

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genetics or rarely think about genetics. So having counselors in the clinics is a very effective tool in educating everybody up and down the line about the importance of genetics, what are the criteria, when do you think about it, how do you do it, how do you refer them. There are still clinicians that I talk to because I know about—I hear through the rumor mill about a case and say, “You really need to refer this person to Genetics.” and they say, “Well, how do I do that?” It’s a very simple on-line referral. So there are still a lot of departments that we have not made inroads into.

*Tacey Ann Rosolowski, PhD*

**0:56:17.6**

Such as?

*Louise Strong, MD*

**0:56:19.6**

Sarcoma.

*Tacey Ann Rosolowski, PhD*

**0:56:21.8**

And that was really on your radar real early.

*Louise Strong, MD*

**0:56:23.8**

Brain. On my radar. Breast by far the most. We could keep hiring genetic counselors endlessly because now sort of every woman wants to have a genetic counselor, but breast, GYN, and GI—gastrointestinal—are the big ones. We’re getting more—we’ve got someone who is trying to become a full-time pediatric genetic counselor, and we’ve got someone trying to work more frequently with melanoma, but there are still lots of areas that they will occasionally refer someone but where it’s really not on their radar screen and we know we’re missing a lot.

*Tacey Ann Rosolowski, PhD*

**0:57:25.1**

So I’m trying to get a sense of how this program works because it seems really decentralized.

*Louise Strong, MD*

**0:57:28.9**

It is. It is.

*Tacey Ann Rosolowski, PhD*

**0:57:30.5**

What is the central part? Who is in charge? Who makes decisions about—

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***Louise Strong, MD***

**0:57:37.7**

It's not—there's a committee. There's a committee and it includes a number of people that I mentioned earlier; Chris Amos, who is a statistical person, Susan Peterson, who is psychosocial—let's see—[Marsha Frazier](#), who does research on GI, and then some of the clinicians. [Banu Arun](#) is the breast medical oncologist who does the high-risk clinic. [Karen Lu](#) is the GYN high-risk person. Patrick Lynch is the GI high-risk person, and that's about it. We have an administrator, and we have a programmer, and all the genetic counselors.

***Tacey Ann Rosolowski, PhD***

**0:58:31.8**

How many genetic counselors do you have now?

***Louise Strong, MD***

**0:58:35.2**

I think we have nine. It happens to be—we happen to have a fair amount of turnover. They are frequently young women who come here on their first job and, you know, it's an age where people have other commitments and competing interests so we do tend to have a fair amount of turnover, but we've got a good—we've got several now who have been here for a long time and that's really helped the program. For a while we just felt like we were kind of like a training program. We have really, really good people but every two or three years you were turning over.

***Tacey Ann Rosolowski, PhD***

**0:59:20.3**

That's tough. That demands resources, too.

***Louise Strong, MD***

**0:59:23.2**

Right. It is decentralized. We're all in different departments. We all have different—some of us are primarily in research. Others are primarily clinicians. But other than not being as widely distributed throughout the institution as we might be, it seems to work pretty well. We have clinical conferences—one a year—where families, patients come and have a chance to hear lectures and ask questions and things like that, so they're sort of patient education conferences.

***Tacey Ann Rosolowski, PhD***

**1:00:09.4**

How do you foresee that program evolving? What are you talking about with your committee for plans for that?

***Louise Strong, MD***

**1:00:17.6**

We're really taking a look at where we are and where we should go. It's clear we can't continue



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to grow the way we have, which is mainly hiring more and more counselors in one or two departments. Now the idea of genetic predisposition is not quite so new. In some areas it may be that we can do a lot of the education at least in part by video, by satellite, things like that. Right now the way it is handled is the way genetic counselors have traditionally operated where it's face to face—one counselor, one person. They take a very detailed family history and draw a pedigree and collect detailed information about the cancer types and things in the family. From that assessment of the person's personal history and the family history they determine whether they're appropriate for testing, and that can include using computer programs that have been developed. Reviewing all the data gives you kind of a score. Then they talk to the person about testing and the risks and benefits of testing and that, again, takes a while. So that first conference is usually an hour. Initially it was only done on people who were at very high risk, but as we have learned more and more it's being done on people who are not at nearly as high risk because we found that some of them do indeed carry mutations. It's not just the highest—the identifiably highest risk ones. Then they come back for an appointment. Then you have to get the blood drawn and sent off for the testing, and then they have to come back to have the results disclosed. Sometimes you do that on the phone, and if it turns out that the results are negative it may be that there's another gene you might test for, and so that's another discussion. So it's very, very time intense—one-on-one type time intense, and these are ongoing discussions. I don't know how it will all be worked out, but there's certainly a sense that we need to look at some other models. Maybe the education phase can be done with a group. Maybe it can be done with videos. Maybe it can be done in advance of the person coming in and then you address their questions. There are just lots of other ways I think that we have to explore doing this. Now, again, the BRCA is so well-known—it's gotten so much publicity that that should be the easiest one to do kind of group sessions, and there are so many people who want to be tested. For that group in particular I think a different approach can be done. For GI, just based on the nature of the genes that were identified, there are some other things that can be done to—that are done to narrow down the group who should be counseled. There are some features of their tumors that the pathologists can pick out and so all of those should be talked to and not others for example just because of features of the tumor that represent the changes that occur in certain genes. So it will not be the same for every tumor type or department. What we're very excited about, but it hasn't been tested at all yet, is hooking up with something called [PreCare](#). PreCare is supposed to go live in some departments as a kind of test system this fall. PreCare is a system by which a patient can complete a great deal of their information before they ever set foot in the door. Right now you don't really exist until you have an MD Anderson number, and so a lot can't get started until you're actually registered. With PreCare a lot of this information could be filled in online from remote and you could be identified by some identifier which may or may not turn out to be an MD Anderson number—I don't know all the details of it—but this information, it includes certain things like a minimal family history. We can then screen and we can identify in advance individuals for whom genetic counseling may be indicated or not, and people can be kind of put in groups of higher and lower risk. Again, not all the details of how this is going to be—how the interconnections are going to go, but it appears feasible. So then what we would have the ability to do would be to develop some algorithms and if personal plus family history equals x, then the



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physician, before he or she ever sees the patient, can get an email suggesting that they be referred for genetics, and we would already have a great deal of information about them without taking up more hours of everybody's time. I think things like that are the main direction that we see as the future, whether it's going to work exactly like that and whether PreCare is going to be the vehicle we hope it is, I'm not sure, but PreCare is being mounted mainly to help us get patients in without such a long lag time before they're actually getting into the system where we can start doing something to benefit them.

*Tacey Ann Rosolowski, PhD*

**1:07:11.4**

Is PreCare the name of a software package or is that a process at MD Anderson? I mean I can look online—

*Louise Strong, MD*

**1:07:18.7**

I honestly don't know.

*Tacey Ann Rosolowski, PhD*

**1:07:19.46**

I'll look online and see.

*Louise Strong, MD*

**1:07:22.3**

I don't think it's a—I think it's more than just a software package but it may come from that. I don't know.

*Tacey Ann Rosolowski, PhD*

Okay. I mean I talked recently with [Deborah] [Debbie Houston](#) [Oral History Interview] in information systems and it's kind of amazing all of the way that software is tweaked to create this really interesting applications.

*Louise Strong, MD*

**1:07:43.0**

But we are so painfully behind in all of that. I mean we're pathetic—we are.

*Tacey Ann Rosolowski, PhD*

**1:07:48.4**

Why do you think that is?

*Louise Strong, MD*

**1:07:52.9**

It's not because we haven't thrown a lot of money at it. We haven't listened to the people who would be using it. People have come in and hired experts, and they set up all these complicated

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systems, and they don't ever talk to the people who are going to use them, and they don't work very well. That's my opinion.

***Tacey Ann Rosolowski, PhD***

**1:08:17.7**

What difficulties have you—what challenges have you faced in this?

***Louise Strong, MD***

**1:08:22.5**

We set up our own—completely our own pedigree system. Clinic Genetics has something that's a little bit similar. I had set up a system for my own research, and we set up one for something that was called the [Cancer Genetics Network](#), which was a national program, but our part of it—the national network—was a Texas cancer genetics network and it was Anderson, Baylor, and [UT San Antonio](#). Chris Amos, again that I mentioned earlier, worked with us and set up a common database for all of us for this NCI study, which, unfortunately, has just terminated—terminated funding—lost funding in other words. So that went from about the mid-nineties until now. We had those kinds of backgrounds of setting up databases that would include the ability to draw pedigrees and do pedigree analysis, and that's what the counselors have used. Although it has obviously been tweaked a lot, but it's totally independent of anything else at MD Anderson. It doesn't interact with anything.

***Tacey Ann Rosolowski, PhD***

**1:09:46.7**

Now is that going to be something that will have to be linked once PreCare goes—?

***Louise Strong, MD***

**1:09:52.7**

It will be linked to PreCare in some way or another so that you will be able to see a pedigree.

***Tacey Ann Rosolowski, PhD***

**1:10:00.2**

How are you going to get that done—without going crazy?

***Louise Strong, MD***

**1:10:07.2**

We've got the same programmers that really kind of set up my program and then the Cancer Genetics Network one and the Clinical Cancer Genetics one now, and they will be working with the people in PreCare.

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## **Chapter 11**

### **A: Overview**

#### ***A Philosophy of Genetic Information and Its Integration into MD Anderson***

##### **Story Codes**

A: Overview

A: Definitions, Explanations, Translations

D: Cultural/Social Influences

D: Ethics

C: Cancer and Disease

A: Professional Values, Ethics, Purpose

#### ***Tacey Ann Rosolowski, PhD***

##### **1:10:19.8**

Wow, that's really neat. I wanted to ask you about how your discoveries in this area and your work—I mean like the p53 gene, the working with survivors, working with these models that give you all this information about patients creates this very wide range of ethical dilemmas. We've talked about it, but I'm wondering, there's this—I'm not even quite sure the question I want to ask—because you've kind of gone through the process with struggling, like, “How do we deal with this?” It just seems like such dramatic information suddenly to hold about individuals, and then you have, how do doctors make decisions based on this information? How do legislators make decisions? How do individuals make decisions? And then here you are, the researcher who is actually providing the basic information, and do you feel that in that role you have a special position as being a person who provides that information? Do you have to look at your own ethical relationship to that information? It just seems like, as you're the person who is making the discoveries and furnishing this—that it puts you in a very unique position, so I'm just wondering if you think that's true.

#### ***Louise Strong, MD***

##### **1:11:54.0**

I think that we're getting to a point of thinking about genetic information as not so just totally different than other kinds of medical information, but that's been a gradual change, and it certainly hasn't finished. Many people do think of genetic information as something so intensely private. It's totally you. Your genetic information is you and no one else in the world. Even if you're an identical twin there are things that change over time that are somatic changes but still make you slightly different than your twin, depending on how the genetic analyses are conducted. It is something that is very personal and people feel very strongly and private about. In another ten years we're going to be able to know our genome sequence. We're going to know we all carry genes that put us at increased risk of things and genes that reduce our risk of things, and it's not going to be a stigmatizing thing anymore because we all carry them. In the studies that have been done to date doing whole genome sequencing to some significant depths of just random people they find an average of something like 200 potentially deleterious mutations in a

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given individual, and this is a perfectly healthy, fine individual that could have been predicted to be deleterious, so I think we're going to have—it's going to be less mysterious to us basically. It's going to be more like something that we can look at and have some interpretation for. Right now it's still very scary to people, very mysterious. It's sort of like, "Who am I? Can you see into my soul to look into my DNA?" I think that's what has made it the difficult ethical issues that you bring up, but I think gradually we're going to become more comfortable with it. We also have blood pressure readings and all the various other kinds of measurements that we have—some things that we can change, some things that we can't change—and we'll begin to learn how to live with those things that we can't change—hopefully a little better using the knowledge about what they are. But it will take a little while. Some people are very scared of this information, as if it's going to expose something very hidden, mysterious that they have no control over. It is control that's part of the issue. You have no control over what your DNA is going to say. I think that over time, as we become more comfortable with the notion that this is part of us, like whether we have the right number of arms and legs or fingers and toes or whatever, we'll learn to handle the genetic makeup that we have and maybe in some cases modify some of the things that we would prefer not to have, but I think there's going to be a transition. Most of the surveys of people who have been invited to participate in these research studies where there would be genome sequencing, and it's all going to be stored somewhere, and we know we don't know how to interpret most of it right now—people have said, "Yes, I want to participate. I understand that this information is going to be used by many different research projects. I don't have to be the only—I don't mind this information being shared." That's kind of a bottom line is that if you're a participant in one of these studies those samples can be used whether you're looking for breast cancer, or schizophrenia, or autism, or hypercholesterolemia, or cardiovascular disease. I mean in terms of big population studies, these samples can be used to look at a very wide range of things, and you have to consent to that, that you know you're going to be part of that and jillions of people are going to be playing with your genome. It's been really quite positive how people want to be part of that, and that's sharing your information, and that's sort of demystifying it a little bit. It's taking out the, "Oh my God, what are they going to know about me?" kind of situation. I think that is showing that at least education is evolving. I don't know what people are being taught in science these days in junior high and high school. I hope they're getting a decent science education. I'm very worried about that because they're going to need to be able to understand risk and what risk means—what a ten percent risk means or a ten-fold increase in risk means. There's just so much information that will be available that we have to have a population that will be able to understand to use it effectively.

***Tacey Ann Rosolowski, PhD***

**1:18:13.6**

On the flip side, with physicians—you were mentioning earlier the number of departments even here in MD Anderson Cancer Center that just don't have awareness. What do you think is needed to overcome that communication gap between geneticists and individuals in those fields?

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*Louise Strong, MD*

**1:18:34.8**

It's going to be a real generation thing. I don't know exactly. Certainly there are all kinds of continuing education things. There are software programs that are written, for example the BRCA gene we talked about some. There are software programs where if you just put in the family history and personal history information it will give you a risk. They are always being updated and adding new things, but I think there's going to be a lot of effort to sort of develop a Watson for genetic conditions for physicians.

*Tacey Ann Rosolowski, PhD*

**1:19:16.6**

What does that mean—a “Watson”?

*Louise Strong, MD*

**1:19:17.3**

Watson? The computer—the robot that won—that went on TV and that played—won the chess game and all that. Isn't that Watson?

*Tacey Ann Rosolowski, PhD*

**1:19:30.9**

I was thinking [Watson and Crick](#)—or Dr. Watson with Sherlock Holmes and there were—(inaudible, speaking at the same time).

*Louise Strong, MD*

**1:19:36.0**

I'm sorry.

*Tacey Ann Rosolowski, PhD*

**1:19:36.3**

No, that's okay. My brain was just trying to figure out which one.

*Louise Strong, MD*

**1:19:40.5**

I think there will be a lot of software to help. Now you still have to know how to think about it a bit, but I think that's one dimension, because it's going to be more information than any of us has the ability to handle on our own.

*Tacey Ann Rosolowski, PhD*

**1:20:01.8**

And the generational piece comes in because you think maybe—

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***Louise Strong, MD***

**1:20:09.6**

Depending on when you were educated you may have had very little genetics. I didn't have very much genetics in medical school. I happened to be interested in it so I sort of sought it out, but you will kind of learn from the people around you. Fortunately there are always new people coming into the field, whether it's a private practice or whatever kind of practice we're going to have in the future. There will be—I assume there will be people who specialize in genetics or—actually it won't be genetics. There will be people who specialize I suppose in cardiovascular genetics or cancer genetics. Certainly with genetic counselors that's the way it is these days, unless you live in a very, very, very isolated area and just kind of have to do everything, and geneticists will just be part of teams that approach—that handle the various common as well as rare diseases. I don't assume that everybody is going to know genetics, and the—what do we call them—[Informaticists](#)—are really going to be critical, and maybe they can put it into forms that you can pull out on your own or not. I don't know. Those would be the programs that one could be able to plug in clinical information and you get at least a series of options.

***Tacey Ann Rosolowski, PhD***

**1:21:49.2**

Well, it's an era of hyper-specialization and so having tools that people can use to easily make another specialty dovetail with our own seems really key.

***Louise Strong, MD***

**1:22:00.3**

And of course all that depends on the electronic medical records and all that sort of thing so that you know not just one piece of a patient's status, but all their other issues—genetic and otherwise.

***Tacey Ann Rosolowski, PhD***

**1:22:12.3**

So it will be interesting to see how this linkage with PreCare evolves because that's kind of a first step toward that.

***Louise Strong, MD***

**1:22:18.4**

It is for genetics being more integrated overall.

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## **Chapter 12**

### **B: Diversity Issues**

#### ***The First Woman Faculty Member with an Endowed Chair***

##### **Story Codes**

A: Professional Path

B: Gender, Race, Ethnicity, Religion

B: Philanthropy, Fundraising, Donations, Volunteers

A: Activities Outside Institution

A: Personal Background

A: Career and Accomplishments

##### ***Tacey Ann Rosolowski, PhD***

**1:22:23.4**

Yeah, that's really interesting. I'd like to shift gears a little bit and talk a little bit about some of your administrative experience if that's okay. We've kind of brought research to a close for a moment. If that's okay with you? One of the things that I have in my notes is that in 1981 you became the first woman faculty member to have an endowed professorship.

##### ***Louise Strong, MD***

**1:22:55.1**

Oh yes, that was nice. There were not very many women here then.

##### ***Tacey Ann Rosolowski, PhD***

**1:22:59.0**

Yes, so that was something I did want to talk about. That professorship, as I understand, became the Sue and Radcliffe Killam chair. So I wanted to ask you about that process—how you came to have that endowed professorship. What do you think the factors were? And then also the transition of that professorship into the endowed chair.

##### ***Louise Strong, MD***

**1:23:25.6**

Well, I have to be honest that no one was more surprised than I. I guess some of the ideas of genetics were relatively new and it was a much smaller institution. It was much easier to know a wide range of faculty, whether basic or clinical, and—I don't know—maybe I was sort of outspoken. I was very fortunate. A lot of really unexpected kinds of things happened to me. I ended up being on the national stage at an early age. In 1975 I had just come back to work full time, and I went to a meeting. I was a speaker at a meeting and I was very excited because I had been a little out of touch with people for a bit. It was Genetics of Human Cancer, put on by NCI, and I gave a talk that had to do with this second hit—the second cancers and radiation and so forth as a second hit in retinoblastoma. After that I was asked to come and give a talk at the

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National Cancer Advisory Board, and that's a very senior group that advise NCI. I didn't know what the National Cancer Advisory Board was. I was asked to come and give a talk and I did, and at that meeting they were proposing a new committee—someone was proposing a new committee that was called—

***Tacey Ann Rosolowski, PhD***

**1:25:26.0**

Is this the Data Evaluation Human Risk Assessment proposition?

***Louise Strong, MD***

**1:25:30.7**

That was a subcommittee. I'm trying to remember what the committee was. Anyway, they were proposing a new committee. This was when everybody was worried about carcinogens, and how to do risk assessment, and if it caused liver cancer in a mouse did that matter to humans and all that kind of—so I was on the Human Risk Assessment—I was asked to be on this Human Risk Assessment subcommittee. I was on—this was a—I mean most of the people I was with—here I am an assistant professor and everybody else on there is a department chair or runs a cancer center or some big national laboratory or something. Of course, again, there weren't very many other women on the committee, but it was an interesting experience.

***Tacey Ann Rosolowski, PhD***

**1:26:23.5**

What were you doing exactly?

***Louise Strong, MD***

**1:26:26.4**

We reviewed reports that came out of labs talking about the effect of these various different—they could be chemicals, drugs. They were maybe things that were used in cosmetics—all these different kinds of chemicals. They did toxicology testing and again, most of it was a mouse model, but in some cases there were other animal models, and then the question was, "How did that really apply to humans?" and "Was it a threat as a mutagen or a carcinogen?" So we reviewed all of these reports and then kind of came to a consensus on what sort of risk this might pose. I was on that committee for a few years, and then it got taken out of the NCI and moved to the [National Toxicology Program](#), which was then looking not only at end points of cancer, but at all other—lots of other kinds of end points of disease.

***Tacey Ann Rosolowski, PhD***

**1:27:47.8**

You were on that for four years. I have 1976 to 1980. That's a—



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*Louise Strong, MD*

**1:27:51.8**

That's when they moved it to a whole different—outside of NCI and more generic for—

*Tacey Ann Rosolowski, PhD*

**1:27:58.8**

Did you continue on it after that?

*Louise Strong, MD*

**1:28:00.2**

No, I was asked to stay on but I decided that I wanted to get into something that would have more relevance to human cancer. I don't remember what year, but then I was asked to be on a board for the—all these groups have changed names so often, but there was an epidemiology branch, and there was a board of scientific counselors I think it was called at that time. I was asked to be on that fairly soon. I was on that for a while, and then I was asked to be on this National Cancer Advisory Board that I'd given a talk to in 1976. This was really a question because [Robert] Bob Hickey, who was executive vice president or something and I were both on the committee at the same time, and I was pretty junior. I was still a pretty junior faculty member. Anyway, I guess what I'm saying is I was getting a lot of national attention and, I don't know, but that may have had something to do with the endowment. Also, I had gotten hired without ever having any startup funds. That was partly the problem of just kind of hanging around—of having been here as a post-doctoral and then kind of continuing. I was never really, really recruited in the usual sense, and so I had never had any startup funds. I hadn't really had what one might normally have gotten in the way of resources. So this was a very nice award. I don't know whose idea it was exactly or exactly how it came about. We have an endowment committee of course—a committee that looks at all the possible endowment sources and makes recommendations to the president for appointments.

*Tacey Ann Rosolowski, PhD*

**1:30:19.5**

You said that you were outspoken. Why did you describe yourself in that way?

*Louise Strong, MD*

**1:30:24.4**

I just mean trying to tell people that genetics in cancer was important—not in a rabble-rouser sense, but just trying to bring awareness. I would somehow get referred, and I'm not sure what the word referred means, because it wasn't like an official clinical kind of referral, but I would hear about families that had an unusual amount of cancer or young-onset cancer or whatever. So then sort of as a research project—a kind of miscellaneous one—I would see them and talk to them about it and try to figure out what we should do to identify whether there was a syndrome—a specific syndrome, even though we didn't have any genetic testing at that point. It would be based more on the clinical pattern of cancer or certain specifics of the tumor, just kind

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of unofficially doing genetic counseling—I guess you would call it, again, in a non-credentialed sort of way, within both pediatrics and some of the adult—particularly GI services. David Anderson did a little bit of that with breast, but I was more medically oriented than he was—or clinically oriented than he was, but occasionally we would have conferences with some of the clinicians to try to figure out what was a good option for this person, particularly if there was some VIP who came in and had a strong family history of cancer, and the institution wanted to do something special. I got to know various people around the institution just through those kinds of activities.

*Tacey Ann Rosolowski, PhD*

**1:32:22.5**

I read also that you came to know the Killams and became friends with them. How did that happen?

*Louise Strong, MD*

**1:32:30.2**

Oh, definitely. Actually—I mean this is another piece of the puzzle, and I don't know whether someone thought they were being cute or not. My dad and Radcliffe Killam were at Harvard together, and they were both from Texas and knew each other. The Killams lived in Laredo, and my dad loved to hunt, and he went down and hunted with them a lot. He held court in Laredo regularly when he was chief judge and would then hunt with the Killams. So they were long time family friends. Now she had—they had—I shouldn't go into it. They had family members who had been patients here and he was in kind of the oil business and all and was a regular donor to MD Anderson. At some point I assume he was approached to endow a chair. I don't even know if he knew that I was at MD Anderson. I really don't know how all that played out, but there was a little something more to it in terms of putting their donation with my name than just random chance.

*Tacey Ann Rosolowski, PhD*

**1:34:03.0**

Yeah, I could see that. I mean you can look at it—

*Louise Strong, MD*

**1:34:04.8**

Whether it would have happened around the same time with some other donor, I've never known. I don't know what—I don't have any idea sort of exactly how that happened.

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## **Chapter 13**

### **B: Institutional Change**

#### ***Growth and MD Anderson Presidents***

##### **Story Codes**

B: MD Anderson History

B: Critical Perspectives on MD Anderson

B: Growth and/or Change

B: Obstacles, Challenges

C: Portraits

##### ***Tacey Ann Rosolowski, PhD***

**1:34:18.8**

But it kind of goes to another issue I was going to ask you about, which is really the Texas connection. That you're from a long-time Texas family and this is a Texas institution and now you have kind of a Texas chair. It's sort of a nice story, and I was wondering just about your impressions of that—about sort of how that might deepen your connections with the state. Then, on the flip side, what does it mean for Texas to have an institution such as MD Anderson?

##### ***Louise Strong, MD***

**1:34:55.8**

Well, I certainly have a very, very strong commitment to MD Anderson. I think we're very lucky that the trustees of the MD Anderson estate chose to buy swampland out in the middle of nowhere and develop a medical center. I think we're very lucky that [R. Lee Clark](#) came around and convinced people that we should have a cancer center. No, it's known all over the world. I can go anywhere and people say, "Where do you work?" and I tell them MD Anderson. So it's a tremendous benefit to Texans and to the world that we developed this place that really focused so much on cancer and on cancer care. I'm very glad that it happened and I just hope we continue to provide the same level of care and so forth for which we have been historically known. I mean the downside is of course it's a huge institution now. It's run much more like a corporation now. There are a lot of things personally that are less appealing about all that but, on the other hand, you just get such amazing stories from people who have come here from wherever under such desperate circumstances, and so I'm very proud to have been here. I do get teased a great deal when I'm out of the state about all of my Texas connections, but I'm used to it. It's very easy if you're introducing me. It's all University of Texas, so that's very easy.

##### ***Tacey Ann Rosolowski, PhD***

**1:36:57.2**

I mean there's an up side and a down side to everything, but you said that you're very proud of your Texas connections. I also read that your maternal grandfather was the first pediatrician in Texas. Is that true?

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***Louise Strong, MD***

**1:37:13.6**

That's what I was told. I've never been able to absolutely document that, but he was from a family that had been physician surgeons, and the story that I always heard was that he had an allergy to whatever the powder or the type of gloves that they had for surgeons then and he couldn't go into surgery, so he decided to go into pediatrics, and pediatrics was a very new specialty at the time. I know he practiced here in Houston. As a matter of fact, the person that was his partner was my pediatrician when I was little—when I was growing up. So I know all that part of it, but I just haven't—a number of different people from different situations tell me that that was true.

***Tacey Ann Rosolowski, PhD***

**1:38:04.3**

And you're named for that side of the family—Connally—is that your maiden name from—?

***Louise Strong, MD***

**1:38:09.8**

My maiden name Connally was my dad's side of the family.

***Tacey Ann Rosolowski, PhD***

**1:38:20.5**

Going back to the issue of the size of MD Anderson, what are some of the down sides that you see now with the enormous growth of the institution, particularly since the 1990s?

***Louise Strong, MD***

**1:38:33.6**

Well, it's just all the problems of growth. There's such a—you're so far removed. The people who make the decisions are so far removed from the people who are carrying out a lot of the work, and there's so much growth in the administration and yet administration doesn't really bring in the money. Look at all the MD Anderson documents these days. We're a work force. What does that tell you? You think you're a faculty member and you're contributing to the institution and you're referred to as the work force. It's just a very different attitude. I mean I think the attitude toward patient care—toward caring about patients and all that is outstanding, but I think that, like other academic institutions, it has become so much more focused on money.

***Tacey Ann Rosolowski, PhD***

**1:39:47.6**

What do you think would need to happen to kind of turn that around? Or what would you like to see the attitude toward faculty, and research, and the physician scientists? What kind of attitude would you like to see?

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*Louise Strong, MD*

**1:40:06.9**

I'd like to see a lot better communication, and everybody acknowledges that this is a problem. You have the senior administration. You have division heads, and you have department heads, and then you have the faculty down here, and then you have all the other support people that support up and down the line, but the communication is very, very poor. If the senior administration tells the division heads something, they expect the division heads to pass it on to the department heads, to the faculty. It doesn't happen. It doesn't happen and, as I mentioned with IT, the programs—many of the systems that are developed—we're given all these mandated things that we have to fill out and do for this, that, and the other, and all these online things. Nobody ever tests them, and so you can spend days tied up with something that doesn't work. I really don't want this to all be in there.

*Tacey Ann Rosolowski, PhD*

**1:41:10.4**

Well, we can turn off the recorder, or we can—

*Louise Strong, MD*

**1:41:13.9**

I just think that there needs to be more faculty input at all levels. I don't really care about having all of this go in there.

*Tacey Ann Rosolowski, PhD*

**1:41:24.6**

That's fine. We can skip over that.

*Louise Strong, MD*

**1:41:28.1**

I mean we can indicate that it's a much bigger institution and the communication is not always ideal. There are lots of ways that that could be improved, but I'd rather not go into the other details. There are just frustrations that I think you would find if you talked to anybody.

*Tacey Ann Rosolowski, PhD*

**1:41:50.6**

I wanted to ask you about the presidents, and I don't know how much contact you had with, but just sort of an impression of the differences in administrative styles between the different presidents and kind of the marks they've left. I've heard it said that—

*Louise Strong, MD*

**1:42:09.4**

Don't be complimentary—(laughter) Go ahead and tell me what you've heard.

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***Tacey Ann Rosolowski, PhD***

**1:42:14.1**

I'm not looking for gossip, but an evaluation. I've heard it said that MD Anderson has kind of had the president who was needed at the particular moment, and that can always have its up sides and down sides, so I'm just wondering what your impression is of the individuals who have been president during the time you've been here.

***Louise Strong, MD***

**1:42:36.7**

Well, I've had a relationship with all of them. R. Lee Clark was a person who made decisions quickly—typical surgeon. He was also a person who was very loyal, so the people that started with him, in general he was very supportive and very loyal. He was obviously very focused on the patient care. We had terrific things like radiation—fabulous radiation therapy and things like that that were just terrific. He did not focus as much on the more basic side of research. That was certainly always kind of recognized as a weaker part of the institution, but he was interested in building a place to take care of Texas cancer patients and was very effective, but he did things kind of in a surgical manner in terms of making decisions and such. LaMaistre was very different than that. First of all, he didn't come from a cancer background at all, and he came from much more the prevention in the pulmonary disease and so forth—a public health, et cetera background, which was a very different background than Clark. Although I certainly knew him I probably didn't interact with him a great deal. From my perspective, which may be totally wrong from others, he didn't really interact as much with the faculty. He lived in a little bit different world. It really worked out well. We grew, continued to recruit good people, and so forth. There was a period, and I can't really define the dates, and that's probably just as well. There was a period when the—not the patient care in terms of the “Did you get treated with the right treatment?” but patient care in terms of the caring that we're known for now, when it was not so near the surface—mid-eighties or early nineties maybe. I had friends who wouldn't consider coming to Anderson after they had been here with their brother, or sister, or friend, or something. They had seen people wait for thirteen hours to get an x-ray at eleven o'clock at night. Again, I wouldn't want to emphasize this, but there were some difficult times, and when Mendelsohn came I don't know how much of it was him alone or others, but that really changed. I think we may have hired more people to help with training and help with being the—I can't remember the word for the person that sort of helps you navigate—the patient navigator—I think that's the word. We just developed processes that were so much more effective in that area. Mendelsohn's early years here, you know he really went around the institution, got to know people, places, things. Seemed to want to know and be involved, and it was very helpful. He was hands on involved in a lot of the recruitments and wanted to bring in good people. Again, I wouldn't put all of this in, but as he evolved in that position, as often happens with senior administrators, he became a little more isolated with his senior administration, but I think he was really the right person when he came in to help us make a correction, so to speak.

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***Tacey Ann Rosolowski, PhD***

**1:47:48.5**

That was a really difficult time, when the HMOs were—it was a struggle, and everyone has talked about that period of time under Charles LeMaistre [MD [Oral History Interview]] as being a real trauma period.

***Louise Strong, MD***

**1:48:00.9**

It was bad. It was a very bad time.

***Louise Strong, MD***

**1:48:03.5**

Both internal—inside departments, and now with the interface, too, with patients, it was really, really difficult. Can I ask you in our last moments about your impressions about Dr. [Ronald] DePinho and how he's come in? I know it's a little bit difficult for you to—and you can address what you'd like to address and not address what you don't want to address, but certainly he brings a new image to the institution.

***Louise Strong, MD***

**1:48:33.5**

Yes, he's extremely strong as a basic scientist. He's very accomplished himself as a member of the national academy and so forth. He is very anxious to sort of raise the bar in basic science at MD Anderson. He can be a very inspiring leader. He's very inspirational to listen to. His goals are things that you can't help but admire him and aspire to. I think there is a little bit of concern about rapidly changing things at MD Anderson, and a lot of the things he wants to do are great, but I think that we have to be sure we remember our mission of taking care of cancer patients, and obviously if we are successful in developing some new therapies for cancer that will give us a chance to be extremely successful at that, but I think we have to be sure that we remember it's not only the drugs and that there is a whole attitude of treating the family and all that sort of thing. He has never been and doesn't really claim to be a clinician, and I think there has been concern a bit that that was an area where he expected everything to just go along fine. We were known for being great at that, and we should just keep on doing what we were doing and not looking at areas where there really might need to be some attention. I mean there is still very much of a hangover from 2008, when all the clinical faculty were asked to see many more patients and not to travel and lost some of their more academic research type time in order to help meet the institutions financial needs, and you can't just now say, "Ho-hum, that's the new normal and we're going to have to work even harder this year." So I have a lot of concerns about that.

***Tacey Ann Rosolowski, PhD***

**1:51:23.7**

How do you feel that your area of genetics and genetic counseling and all the areas that your



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work touches—how does that dovetail with some of the missions that Dr. DePinho has identified—and what support do you think will come down the line from that?

***Louise Strong, MD***

**1:51:46.1**

I don't know the answer to that. His primary focus is developing drugs that will target genetic changes in the tumor—that will directly target the tumor so that you, ideally, end up with greatly reduced side effects and very scientific targeting of the tumor cells. Now to do that he sees this broad genomic analysis, so you need to know all the genetic changes in the tumor. That's not quite possible because the tumor is constantly changing itself. Then you have to know what the normal tissue is, too, of course, so you know what has changed in the tumor. Now to the—so he is focused on the end point of treating the tumor. My end points are more focused on the normal genome that may carry genetic predisposition and how can we intervene at that point in time before we have this tumor with all of its genetic end points. So they're different points of intervention. They're not unrelated. If you're sequencing the tumor genome you're getting the normal genome as well. In theory, we could get a lot of feedback from the genomic work that's done from tumor in normal pairs because we would just like to look at the normal part of it. Whether that will actually work that way or not I don't know. There also is a lot of—or some increasing interest in the normal genome may have genes that not only affect whether you get cancer, but how you respond to different treatments, and so there is that interest in characterizing the normal genome; how you respond to treatment, kind of what your prognosis is—those kinds of things. Whether you would respond better to treatment A or treatment B based on your genome make up. So there are those points, but right now what I see, with the tremendous focus on the tumor genome, I don't see our area getting a lot of benefit. Maybe it will in the long run. I don't see us being considered irrelevant, but I don't see it being some sort of a windfall. I do see, if we can work out this PreCare business with the genetic information and the ability then to sort of screen all the new incoming patients, so to speak, I think that could provide a great deal more activity in the genetic testing, genetic counseling, genetic intervention opportunities.

***Tacey Ann Rosolowski, PhD***

**1:55:24.3**

Well, thank you very much. We've run a little bit over today so I want to make sure that I don't take too much of your time. Thank you very much for today.

***Louise Strong, MD***

**1:55:34.2**

I may have to edit out some of the things that I—

***Tacey Ann Rosolowski, PhD***

**1:55:38.4**

It's five minutes after twelve.



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*Louise Strong, MD*

**1:55:39.2**

I don't want to have it end on a negative—

**1:55:42.5** (End of Audio Session Two)