

Contemplating Change in the Face of Risk:
A Series of Articles about Approaches People Use When
Considering Behavior Change to Reduce Cancer Risk

Sara Waynette Morley

A thesis submitted to the faculty of the University of North Carolina at Chapel Hill in partial fulfillment of the requirements for the degree of Master of Arts in the School of Journalism and Mass Communication.

Chapel Hill
2007

Approved by:

Dr. Rhonda Gibson

Dr. Barbara Friedman

Professor Jan Yopp

© 2007
Sara Waynette Morley
ALL RIGHTS RESERVED

ABSTRACT

Sara Waynette Morley

Contemplating change in the face of risk:

A series of articles about approaches people use when
considering behavior change to reduce cancer risk
(Under the direction of Dr. Rhonda Gibson, Dr. Barbara Friedman
and Professor Jan Yopp)

This series of articles is designed to help readers understand the role of risk factors in cancer diagnoses and to determine what approach is best for them when faced with their own risk factors for disease. The first article, “A Cancer Primer: Understanding Cancer’s Causes and Treatments and the Role of Risk Factors,” includes a simplified explanation of cancer and is accompanied by a graphic outlining basic cell division. “A Cancer Primer” introduces the reader to up-to-date research and expectations for future research, and to explanations of motives for behavior change. Articles two and three, “One Man’s Cancer” and “Choosing to Live with Risk Factors,” explain the choices of two men who’ve made very different decisions about behavior change based on cancer risk information. Lastly, the final article, “Information and Misinformation” can be used as a sidebar or a stand-alone piece. It guides readers to reliable and accurate cancer information and gives them tips for evaluating cancer-related information on the Internet.

To my mother, who has always been proud of me, and to Butch, for believing in me and cheering me toward the finish line, thank you. I couldn't have made it without you. To my children and grandchildren, I want to give the gift of dreams. It is never too late to be all that you have dreamed.

Dream big.

ACKNOWLEDGEMENTS

This series of articles is meant to be the finest work a graduate student can complete, but I have found that it is much more than one person can accomplish. This is a team endeavor, and I have had the great fortune to be taught by some of the most respected names in journalism. Thank you all for your years of dedication to the field and its students. Thank you, Dr. Rhonda Gibson, for advising, mentoring and mothering me through one of the most rewarding experiences of my life.

Preface

Making informed decisions about cancer prevention and treatment requires an abundance of information, but that information can seem like a giant jigsaw puzzle. The idea for this series of articles began with my quest to put the pieces together for myself after three family members were diagnosed with cancer. I wanted to understand why some people who have no cancer risk factors still get cancer while others with multiple risk factors remain cancer-free. This series of articles is my attempt to show readers the information that I have learned about cancer risk factors, prevention, treatment and current and future research. I have also tried to put a human face on the subject by introducing readers to two men who have reacted to cancer risk in two very different ways.

Jimmy Jacobs, my 69-year-old step-father, was diagnosed in May 2003 with renal cell carcinoma. The diagnosis was unexpected because his only apparent risk factors were age and gender. He had successful surgery to remove the cancerous kidney, after which my brothers, step-brother, step-sister and I eagerly put cancer out of our minds. But the cancer wasn't completely gone. In October 2004, surgeons removed a portion of Jacobs' right lung because kidney cancer had spread there.

In the meantime, in June 2004, Jane Morley, my mother-in-law, was diagnosed with pancreatic cancer. By then I was working for a marketing firm in Cary, N.C., that provided newsletters to pharmaceutical consumers. I had open access to medical research, so I learned that her chances of living longer than one

year were slim. In July 2005, she died. She had pancreatic and gallbladder cancers, but her only evident risk factor was age. She was 74.

Reba Jacobs, my 60-year-old mother was diagnosed with breast cancer in December 2005. Her cancer was treated with surgery and radiation and is currently in remission. Her only known risk factor was being a post-menopausal woman. She now takes anastrozole, a post-surgery drug designed to keep breast cancer in remission.

The reason that I pursued this cancer research was to answer one basic question: Why would three people get cancer when they had few real risk factors? After learning the answers myself, I thought the explanation would be useful for others. And, I thought others might benefit from reading about various strategies that people use for coping with cancer risk and diagnoses.

This series, three in-depth articles, an information graphic and a short sidebar, can be used by magazine or newspaper editors with a great deal of flexibility. The first of the three articles, “A Cancer Primer: Understanding Cancer’s Causes and Treatments and the Role of Risk Factors,” is an introduction to cancer biology, cancer’s risk factors and some of the actions that people take to reduce their risk of cancer or its recurrence. The sidebar, which includes specific tips for finding and evaluating information about cancer, can be used as a complementary piece adjacent to this article or as a stand-alone piece at the end of the series. The information graphic, which provides a simple explanation of cell division, may be dropped in the event that the publication’s audience is savvy about medical information.

The second article, “One Man’s Cancer,” explains the lifestyle changes Jacobs made to treat his cancer and reduce his risk of recurrence. Article number three, “Choosing to Live with Risk Factors,” explores Zemp Edge’s idea that, even with irrefutable evidence of cancer risk factors, everyone should live for today. Jacobs and Edge’s stories are just two of the many approaches that people take when faced with news of cancer risk, but they help provide a context within which the reader can assess information, examine his or her own quality of life issues, and make decisions about possible lifestyle changes. The two stories are written to stand as separate pieces, which would be published in subsequent editions. However, with little editing, Jacobs and Edge’s stories could be combined to make one that juxtaposes the men’s divergent approaches.

Although in many cases cancer is still a life-threatening condition, it isn’t necessarily the death sentence that it was in the 1970s and 1980s. But the lack of clear information about cancer sometimes causes undue anxiety and worry. This series cannot answer “Why?” for everyone, but the series is designed to break cancer information into understandable chunks and then rejoin those pieces around the idea that each person is capable of gathering enough credible information to get a personal answer and thus decide if there are changes to be made.

TABLE OF CONTENTS

Chapter	Page
1	Introduction.....1
	LITERATURE REVIEW.....2
	ENGAGING vs. INFORMING.....5
	ANECDOTES AND EXAMPLES.....7
	READERS' OPTIONS.....8
	EVALUATING THE INFORMATION.....10
	METHODOLOGY.....13
	LIMITATIONS.....20
	Notes.....22
2	A Cancer Primer: Understanding Cancer's Causes and Treatments and the Role of Risk Factors.....29
	Understanding Cells and Cancer: A Biology Refresher.....30
	Stopping the Mutations.....32
	Predicting Cancer Using Risk Factors.....36
	Counteracting Risk Factors.....37
	Winning the Fight against Cancer.....40
	Living with Cancer Information.....41
3	One Man's Cancer43

	Prognosis: Dismal.....	45
	Treatment Options and Emotions.....	48
	Beyond the Drug’s Side Effects.....	51
4	Choosing to Live with Risk Factors.....	55
	Learning About Cancer’s Potential	57
	Doctors: Variety and Moderation	
	May Be Key.....	59
	Treating Blood Disorders.....	61
	Living With Risk Factors.....	62
	Tough Habit to Break.....	64
	Steps to Changing Behaviors.....	65
5	Risk Sidebars.....	68
	Information and Misinformation.....	69
	Simplified Explanation of Cell Division.....	73
	Bibliography.....	74
	Interviews.....	85

Chapter One
Introduction

Risks. Cures. New drugs. New treatments. Dire predictions. Television, radio, newspapers, and magazines bring new reports of cancer, its risks, and possible treatments every day. Incredible facts and contradictions fill the nation's headlines:

"Tomato-rich diet could reduce cancer risk"

"Study says people at risk for colon cancer should curb drinking, take folic acid"

"Cabbages 'cut lung cancer risks"

"Obesity linked to multiple cancer risks"

*"Cancer risks linked to common pollutant: Report urges stricter EPA limits on industrial solvent in drinking water"*¹

LITERATURE REVIEW

In "New Surgeon General's Report Focuses on the Effects of Secondhand Smoke,"² U.S. Surgeon General Richard H. Carmona reported that when it comes to cigarette smoke, there are no risk-free situations. This latest report says that exposure to secondhand smoke can increase lung cancer risk 20 to 30 percent.³ "Even brief exposure to secondhand smoke has immediate adverse effects on the cardiovascular system and increases risk for heart disease and lung cancer."⁴ Even more puzzling to readers is that the news about cancer risks seems to change almost daily. How can readers make sense of the news and decide what action to take?

Psychologist Albert Bandura developed social cognitive theory to explain how people learn appropriate behaviors.⁵ He theorized that the behavior of individuals, and, therefore, the possibility for changing behaviors, is affected by three things: the person's current beliefs, the proposed behavior, and the environment.⁶ Bandura went on to explain that the media have the power to influence attitudes and behaviors because of the public's perception that media-reported events reflect reality.⁷ Eleanor Singer and Phyllis M. Endreny, co-authors of *Reporting on Risk*, wrote that "knowledge about, and even attitudes towards, certain kinds of hazards

are influenced by their coverage in the media.”⁸ In a case study of the coke production facility in Clairton, Ohio, Jeannette M. Trauth, a University of Pittsburgh research assistant professor of Health Services Administration, confirmed the results of these and other researchers when she showed that the media play a significant role in influencing public perceptions.⁹ Trauth evaluated 40 years of local newspaper coverage of risks associated with coke emissions near Clairton and then conducted qualitative research in the community to survey the public’s risk perception.¹⁰ Most community members said that their main source of information was the local media, but Trauth found little media coverage that explained the associated environmental health risks or made the information relevant to those readers.¹¹ She corroborated other findings that demanded more reliable and accurate media coverage and suggested that journalists convey the news in ways that readers could apply to their lives.¹²

Although the readers in Trauth’s case study said that they got most of their news about health risks from the local media, they added that their most trusted source for answers about risk was their physician.¹³ However, approximately two-thirds of the respondents felt they were not getting enough information. When asked from which source they would most like to receive additional information, the respondents replied that they would like the information in easily accessible sources, such as “newspapers, flyers, and newsletters.”¹⁴ But this response still leaves consumers to determine the credibility of the source and then to wade through the often conflicting and confusing information in order to find reliable, accurate information with which to weigh health risks.

The Health Belief Model of behavior was developed in the 1950s by U.S. Public Health Service social psychologists.¹⁵ HBM, a value expectancy theory, asserts that a person will adopt or change a health behavior when he or she wishes to avoid illness or get better and believes that the new healthy behavior will accomplish that goal.¹⁶ According to Strecher and Rosenstock, if the news consumer decides that the risk of cancer or ill health is real, immediate, and pertinent and believes that the behavior change will avert disaster, then a change may be attempted.¹⁷

For instance, Natural Selections Foods recalled spinach in September 2006 because of an E. coli outbreak that started as a result of contact between its spinach crops and nearby animal waste products.¹⁸ Consumers temporarily stopped buying spinach, even the spinach distributed by companies other than Natural Selections.¹⁹ The E. coli outbreak caused an immediate reaction from many spinach consumers. According to FOX News, California spinach farmers estimated a loss in sales of \$1 million per day for the duration of the scare.²⁰ The immediate threat resulted in a change in consumer behavior.

Conversely, little real change has been seen in the number of smokers even though smoking is reported to be directly linked to many cancers.²¹ In 1994, an estimated 30 percent of Americans smoked.²² Although statistics vary, by 2007, that number has decreased only to about 21 percent (24 percent of American men and 18 percent of women smoke).²³ In the United States, approximately one out of four men and one in five women smokes even though media and health professionals have presented more than 50 years of cancer risk information.²⁴ This statistic has

remained static since 2002 and contains smokers who started amid the building evidence that smoking is dangerous to everyone.²⁵ Breaking the nicotine addiction is often difficult, but this statistic reflects both smokers who heard the first Surgeon General's warning in 1963 and new smokers. Teens and young adults help to fill out the ranks.²⁶ Did something about the reporting of the E. coli outbreak cause an immediate behavior change whereas many years of coverage on the danger of smoking has caused little decrease?

ENGAGING vs. INFORMING

Reporting on health risk is tricky business.²⁷ According to Singer and Endreny, risk is the "probability of property damage, injury, illness, or death associated with a hazard."²⁸ Trauth and Singer and Endreny found that the media reported mostly about the hazard (heart attack, stroke, E. coli outbreak, cancer, etc.) and spent little time describing and explaining the associated risks.²⁹ Keller and Block's research into the effectiveness of messages found that readers did not concentrate upon the conditions necessary to change a situation when the message heavily accentuated the danger or threat.³⁰ Beck and Frankel found that the threat of a health-related risk should be conveyed, but the danger or threat should not be over dramatized, thereby causing avoidance or denial of the message.³¹ So, even when the reporting is balanced and accurate, the problem of the reader connecting to the risk and then reacting remains. Too often the information is not framed in a way that will effect change. According to Keller and Block, Bandura, and others, reporting the risk may not be nearly as important as how the threat is framed.³² The message

must contain clear information about the necessary behavior change and should also stress the idea that completing the behavior change is possible.³³

In the Natural Selections case, the news reported the E. coli hazard and a behavior change that readers could easily accomplish: halt spinach purchases. In smoking-related reporting, the demand is that the reader quit smoking. But the behavioral change, cessation of smoking, is very difficult to accomplish, in part because of cigar and cigarette smoking's addictive properties, reinforcing peer exposure and pressure, and the comforting habit of smoking. There is no such addiction or habit-forming behavior associated with spinach. When reporting on a deadly outbreak of E. coli, the mere reporting of the facts is dramatic enough to effect immediate change in some people. When reporting on the hazards of smoking, a personal habit, a balanced and complete story must also include information about effective smoking cessation techniques and the positive outcomes of quitting.

According to Brandon Johnson, a research scientist in risk communication, readers are more likely to believe the risk of a dramatic but unlikely event, such as a nuclear power plant accident or death by E. coli, than they are to believe the risk of contracting some diseases.³⁴ His research on readers' knowledge of risk perception may show why some people choose to believe and follow the health-related advice of doctors, researchers, and the media and why others discredit that information out of hand.³⁵ Johnson used Bandura's social cognitive theory construct related to outcome incentives or expectancies,³⁶ wherein each person assesses information and facts through the lens of his or her cultural norms, previous personal and

acquaintances' experience, and peer pressure.³⁷ The construct states that "if all other things are equal, a person will choose to perform an activity that maximizes a positive outcome or minimizes a negative outcome."³⁸ But, as stated above, all things are not equal. Each person is under both internal and external pressures to remain unchanged. Therefore, emphasis on, and therefore the rewarding of, immediate positive outcomes is a more effective means of changing behavior than emphasis on the negative aspects of a hazard or its risk.³⁹

Researchers like Keller and Block, Beck and Frankel, and Shiv et al. also agree that accurate factual reporting may not be enough to engage the reader.⁴⁰ They found that message framing plays a key role in message acceptance.⁴¹ When a person receives a message with a high degree of threat, there is the tendency to avoid the message or deny its relevance to his or her situation.⁴² Bandura and Beck and Frankel contend that messages should be framed within the context that the new behavior is possible and will result in the expected change in health.⁴³

ANECDOTES AND EXAMPLES

According to Julian Rappaport, a University of Illinois professor of psychology, personal stories about challenges and victories are valuable motivators when it comes to understanding the need for and making changes. He asserts that each person's life story is actually an integration of his or her personal experiences and those of other community members.⁴⁴ Rappaport believes that the stories of others help individuals to change because each person integrates the experiences of others into his or her own life.⁴⁵ In Kissman and Torres' study, *Incarcerated Mothers Mutual Support Groups Aimed at Reducing Substance Abuse Relapse and*

Recidivism, thirty incarcerated women were divided into two groups. The purpose of each support group was to change each woman's responses to outside events and to help her learn positive coping skills. The two groups learned to share stories of their lives, so that they could change their own stories and change their lives.⁴⁶ This sharing can be uplifting and can be the impetus for change when the stories are focused on change.⁴⁷ Availability of these anecdotes is essential to individual, as well as community change.⁴⁸ Rappaport uses Bandura's social cognitive theory to explain identity. According to Rappaport, personal identity is shaped in the context of shared narrative, which supplies memory, emotion, and meaning.⁴⁹

Each person has to make an individual decision to change unhealthy behaviors. Behavior change made in the face of disaster is often only temporary because environmental factors do not support a permanent change, but the research of Rappaport and Kissman and Torres shows that the sharing of personal stories along with information about the need for change and the possibility of its success will change behaviors.⁵⁰ Change made through personal commitment to a better life can be permanent.⁵¹

READERS' OPTIONS

Today, readers have easy access to a multitude of medical information sources. But an evaluation of the sources found that few offer messages with detailed information about the mechanisms of cancer and its risk factors while emphasizing the immediate positive outcomes of behavior change. In most cases, clear, comprehensive information about cancer is offered only to readers who are already health information seekers; those who psychologist James Prochaska

describes in his stages of change theorem as being in the preparation or action stage.⁵² Prochaska's theory states that there are six stages of change: precontemplation, contemplation, preparation, action, maintenance, and finally termination.⁵³ In the preparation stage, a person has decided to change behaviors within the next month and is building resources in anticipation of that change.⁵⁴ In the action stage, a person modifies his or her behavior.⁵⁵ During both stages, these individuals are actively seeking online and offline information from sources such as popular magazines, newspapers, TV and radio news, and their physicians.⁵⁶ Information in health or fitness magazines is aimed at health and fitness conscious readers who are already anticipating or have made the change. Readers who are seeking information from medical journals are also in the preparation or action stages. The nature of this series, news and real life experiences, will allow it to fill a news gap by informing readers in all of the stages of change both by its presentation and its location in a family health magazine.

Among online and print news providers that offer information discussing behavior change, there seem to be few items that combine clear concise cancer risk information, anecdotes to describe some of the possible choices, and information about the many positive effects of change. No series such as this was turned up in a search of health news providers, including *Prevention* and *Prevention.com*, published by Rodale, Incorporated; *Health*, by Health Magazine; *Alive Magazine*, *Self* magazine; *The New York Times*, and *washingtonpost.com*. The World Wide Web, quickly becoming the most accessible venue for information and support, provides quick access to some reputable, high-visibility health or cancer-specific

providers, including The U.S. Department of Health and Human Services, the National Institutes of Health, and the Centers for Disease Control and Prevention.⁵⁷ It is also home to many pharmaceutical manufacturer web sites. None of these sources provided the type of information, all in one place, as this series will.

My limited inventory does not examine all of the literature on the market, but the results mirror the opinions expressed by researchers: Most information aimed at informing the public about risk is framed with the emphasis on the hazard (heart disease, cancer, or kidney disease) or the risk factors (don't smoke, eat right, and exercise) and skims over or eliminates the idea that a person is capable of assessing the risk and deciding on an appropriate response. There is little information that combines the above factors with an emphasis on the positive and immediate effects of change.

EVALUATING THE INFORMATION

Consumer Reports, a widely recognized provider of accurate and objective consumer information, is published by the non-profit research and testing organization, Consumer Union.⁵⁸ CU cautions its readers, both online at *ConsumerReports.org* and *ConsumerMedicalReports.org* and offline in the print version, to become better educated about health risks so that they can make informed treatment and risk-related decisions.⁵⁹ According to *Consumer Reports*, not everyone is on the same page when discussing risk. An example is when the physician says that his or her patient has a 2 percent chance of having a heart attack. The physician explains that the risk will be reduced by 50 percent if the patient begins taking aspirin every day. That sounds pretty good at first. On a

second look, though, the patient may decide that a 2 out of 100 chance of a heart attack does not seem very high to start with, and since aspirin increases his or her risk for stomach ulcers, it does not seem logical to take the aspirin to lower his or her chance to only 1 out of 100.⁶⁰ According to *Consumer Reports*, it is important for each reader to learn to ask for the real risk numbers, the absolute risk, before taking the leap.⁶¹

JupiterResearch, a research organization which studies the impact of the Internet on businesses, conducted *US Health Consumer Survey, 2006: Online Health Media Consumption and the Impact of Increasing Health Consumerism* and found that as health consumers are pushed to become more proactive in their healthcare decisions, they turn more often to the Internet.⁶² In fact, in a recent telephone survey conducted by the Pew Internet & American Life Project as part of the Pew Internet Project, researchers found that approximately 80 percent of Americans have searched for health information online.⁶³ But, according to the JupiterResearch report, the consumer most often finds that information in the mounting number of “pharmaceutical sites, prescription drug ads, email newsletters, content sites and health assessment and management tools.”⁶⁴ As uncomfortable as many in the healthcare community may be with readers, their patients, getting health information from advertisers and pharmaceutical companies, the inaccuracies and misinformation that abound on the Internet may be a bigger problem. Barbara Friedman, author of *Web Search Savvy: Strategies and Shortcuts for Online Research*, found that the Internet can be a great resource for finding support groups, medical databases, and clinical trials, but it would be “unrealistic to expect every

web site to be well-researched and well-reasoned.” She cites mistakes and inaccuracies in web sites hosted by well-respected authorities.⁶⁵

In the 2002 study, *Internet Use in Families With Children Requiring Cardiac Surgery for Congenital Heart Disease*, 58 percent of the 160 families surveyed sought health information on the Internet. And according to Ikemba et al., one of the main goals of incorporating the Internet into the medical field is to educate and inform patients. As a result of that study, however, Ikemba et al. determined that it is important for healthcare providers to be proactive in providing Internet sources that give accurate information and to be vigilant in uncovering inaccurate Internet information upon which their patients are relying.⁶⁶ Dr. Alan R. Spitzer, SUNY neonatal pediatrician, wrote to physicians that since “material on the Internet is so questionable in many cases, it is often helpful to direct families to quality web sites that we know are reliable.” Spitzer and Ikemba et al. strongly urged physicians to become educated on materials that are available online and then recommend reliable information providers.⁶⁷

With misinformation so prevalent on the Internet, consumers may not know how to assess the credibility of sites or where to turn for safe, accurate information.⁶⁸ According to the Pew Internet Project survey, three-quarters of Americans, about 85 million, say that they do not regularly check the credibility of the sites they search.⁶⁹ This leaves the door wide open for misinformation. A first step, according to Lindberg et al., to eliminating the possibility of receiving inaccurate and possibly dangerous information is to begin the search in dependable directories such as Health Web or New York Online Access to Health.⁷⁰ Some sites referred by

Consumer Reports are *Annals of Internal Medicine*, *BMJ*, *The Journal of American Medical Association*, *The Lancet*, and *The New England Journal of Medicine*.⁷¹

Readers can also set up their own standards by which they judge the quality of information. In *Web Search Savvy*, Friedman suggests a common sense check as a first step: Does the information and the site seem reliable? Then she suggests applying a hierarchy of trust to Internet domains beginning with .gov and .mil sites as the most reliable. After deciding upon the possible reliability scale of the domain, she suggests checking for an abundance of errors or photos, images or article excerpts that are missing author or photographer's name and credentials. Friedman recommends that the reader check the date of posting and the last update and then be aware of the site's agenda. In addition, a combination of mistakes or missing information may mean that the information has not been reviewed by other professionals in the relevant field.⁷²

METHODOLOGY

When people are faced with a cancer diagnosis or presented information about their risk of cancer, they choose a variety of scientifically proven and unconventional methods in the hopes of prolonging their life. Still others scoff at the news or simply choose to "enjoy life."⁷³ The aim of the series is to present risk information in a new way: Fill the void with clear, concise information that readers can use to effectively assess their risk for cancer. As of this date, the author knows of no series that defines risk, shows samples of behavior changes associated with risk information, and then offers stories of individual reactions to cancer risk information. "Contemplating change in the face of risk," a series of three articles and

one sidebar, will also show some of the extremes to which people will go to reduce their risk of disease and, at the opposite end of the spectrum, the complete disregard that some others have for risk research and reporting.

The first article in the series will be a refresher course about cancer. It will include a simplistic explanation of cancer, what causes cancer, risk factors, and some examples of treatments and lifestyle changes that people have used in the hopes of reducing their risk. Readers will be put in control of their own risk assessment through the articles juxtaposition of extreme examples and the healthy behavior changes. Each reader should weigh the impact that he or she perceives behavior change will have on quality of life. Health professionals will be interviewed to provide healthy behavior as a preventive treatment alternative. Healthy behavior outcomes, both immediate and long-term, will be briefly discussed.

This article and the series of articles will present a new way of thinking about disease, cancer, and behavior change. Reporting on risks can be a challenge, but it is the responsibility of the reporter to give accurate information based upon analysis of competing resources. The article will address risk factors for cancer, including the specific risk factors for kidney cancer. It will include risk factor information collected from web sites and journal articles, which are published by reputable research organizations including the American Cancer Society, the National Cancer Institute, the Kidney Cancer Association, the FDA, BMJ, and the CDC.

There will also be information about risk evaluation. Much of this information will come from journal articles and books, but there will also be information gathered from interviews with physicians. Most reporting on risk factors or the hazards

involved (e.g. heart disease, lung disease and cancer) gives the reader no information about how risk data is collected, how relative the data is to the reader, and the immediacy of the risk.

This article will tie the series together by focusing on risk factor evaluation and the behavioral changes and treatments people have chosen when faced with risk information. The article will briefly show some examples of extreme treatments or behavioral changes that people will adopt in order to reduce their risk of cancer or its recurrence. Some examples include detoxification by combining a regimen of coffee enemas and a no-sodium diet,⁷⁴ experimentation with alternative remedies such as shark cartilage,⁷⁵ genetic testing,⁷⁶ pre-diagnosis mastectomy,⁷⁷ and immuno-augmentative therapy.⁷⁸ The article will use physician interviews to help outline healthy behaviors and the benefits derived from those changes that are incidental to but perhaps more immediate and pertinent to the reader than reducing the risk of disease.

Two other articles will present two typical responses to risk of disease through the stories of Jimmy Jacobs and Zemp Edge: Jacobs who employs extraordinary measures and behavioral changes in the face of danger and Edge who stubbornly refuses to change because of a belief that danger is remote. Those articles will compare and contrast their use of health risk information.

Jacobs is a non-smoker in his 60s. His age and gender make him a candidate for kidney cancer, but he has none of the other risk factors: Jacobs does not have von Hippel-Lindau disease, a hereditary disease affecting the brain; he has no family history of kidney cancer; and he has never had dialysis treatment. Prolonged dialysis

treatment is high on the risk list.⁷⁹ But in May 2003, Jacobs was diagnosed with renal cell carcinoma, one of the rarest forms of cancer, accounting for less than 3 percent of all cancers in the United States.⁸⁰ Because of his cancer's spread, he should have had a 5 percent to 15 percent chance of surviving five years. (Even in a year when the news is good for cancer survival, about 13,000 people are expected to die from this cancer.)⁸¹ Approximately three years after Jacobs received the news that the cancer had spread to his lungs, his cancer was in remission for the first time.

Jacobs' article will focus on his decisions to alter his behavior only when faced with news of a health problem. He lost weight to lower his high blood pressure and changed his breakfast menu to oatmeal and strawberry-rhubarb compote when he was told about his cholesterol levels. Both changes were effective, but the weight loss was temporary. Before Jacobs knew of his cancer, he was opposed to taking medicine or pills. In fact, he rarely took aspirin even to relieve a painful headache. His only concession to using a dietary supplement was Zinc once a day. After learning that there was no cure for his cancer and no effective treatment other than surgery, Jacobs and his wife decided to do some research in the hopes of finding something about which the doctor had not known. Reba Jacobs, Jimmy's wife of 20 years, found information on the Internet that led them to experiment with apricot seeds and a nutritional supplement, both reported to cure cancer. Once again, Jacobs changed his behavior temporarily when faced with impending disaster. A man who rarely took medications or over-the-counter remedies started consuming large doses of the nutritional supplement and eating the maximum recommended quantity of apricot seeds.

The article will discuss the fact that Jacobs' cancer is one of the rarest forms in the United States, diagnosed in only 36,000 people each year.⁸² When compared to the nearly one million cancer cases diagnosed each year,⁸³ it is easy to understand why pharmaceutical companies have not focused their efforts on finding a cure for renal cell carcinoma. But Jacobs' cancer was in remission eight months after he began taking the newly approved drug Nexavar. Jacobs believes that the combination of the nutritional supplement, apricot seeds, and Nexavar were responsible for his first remission. When Jacobs' cancer was in remission, he reduced his use of the nutritional supplement and has not made any pre-emptive diet or exercise changes, which are reported to control the risk for cancer and its recurrence. This illustrates one of the extreme behaviors discussed in article one: When faced with the option of death by cancer, Jacobs altered his attitude toward medications and over-the-counter remedies, but when the danger receded to the background, he reverted to his pre-cancer behavior. The segue into the second half of the article is the anecdote Jacobs tells of a conversation between him and his sister, a smoker and breast cancer survivor. It shows how Jacobs' beliefs have changed to a sort of "live and let live" attitude: Each person should be able to decide for himself, without pressure from others, what unhealthy behaviors he wants to keep or what healthy behaviors he thinks are necessary to change.

For the first part of this article, data collection will consist of a series of in-depth interviews with Jimmy Jacobs and his wife, Reba. There will also be excerpts from an interview with Jacobs' primary care physicians, Robin Adriance, a nurse practitioner, and Dr. John Hill, an oncologist. Information will also be gathered from

medical and scientific journal articles, pharmaceutical press releases, web site materials and newspaper and magazine articles.

Harvey Zemp Edge, Jr, 49, will be interviewed for a third article. According to the data, Edge is at risk for cancer: He has smoked for 33 years; He's a male approximately 50 to 70 years of age; and he admits to a poor diet.⁸⁴ However, there is no cancer. The article will report on Edge's motivation or lack of motivation to change his behavior, especially in light of a maternal family history of cancer. Edge knows that he is at risk for cancer, heart disease, lung cancer, and many other life-threatening diseases, but he has chosen not to change his behavior. Some of the research on risk factors and disease collected for the Jacobs article will be restated here.

Risk is often discussed in vague or irrelevant numbers that are hard for the reader to apply to his or her situation without an understanding of the meaning of risk. Risk is the probability that death, injury, or loss may occur because of a person's exposure to a chemical or event.⁸⁵ And risk factors are determined by comparing a sample of people who have been exposed to something, i.e. kidney cancer patients who have taken nutritional supplements, to the same number who haven't. The percentage of people who develop cancer is the relative risk that others who experience the same conditions will develop it also.⁸⁶ Although risk factors are not necessarily the cause of cancer, tests such as the one described above often give researchers and physicians the information that they need to predict future diagnoses and to label behaviors to avoid. Finally, there will be a sidebar about risk. It will describe the method researchers use to determine risk factors and show

credible, authoritative locations to find risk and cancer-related information. An interview with an oncologist and various print and online materials from sources such as the American Cancer Society, the National Institutes of Health, and the National Kidney Cancer Association will provide this information.

Bandura and others wrote that the media control the type and content of the information that people use and by which they are influenced.⁸⁷ They called on the media to be responsive to the public's need for relevant, accurate health information. The overall objective of the series will be to show the risk factors for cancer, explain how risk factors are determined, show how some people react to risk factor information, and give the reader some new tools to help him or her adequately evaluate risk information before deciding what changes are necessary. Not only must the series provide the information, but according to Keller and Block and others, the articles' message must be structured in a way that presents the information about the danger of cancer without being overly dramatic. The researchers believe that the message should not be so strong that it provokes avoidance and denial. After giving the reader the tools to assess his or her risk, the series should provide information that allows a person to change.⁸⁸ Johnson's research indicated that, given positive information about the possibilities of change, a person will choose behaviors that give the most positive outcome.⁸⁹ Given the plethora of misinformation, this series should also strive to fill the void that is clear, concise information about cancer risk factors and options for healthy behaviors.

LIMITATIONS

This series is designed to help readers make informed decisions about cancer prevention and treatment strategies, but it has limitations that are important

to note. One such limitation is that it is impossible in just three news articles to summarize the huge amount of literature that is available on the subject. There are literally thousands of cancer-related studies published in academic journals, along with numerous stories in the popular press and seemingly endless information found on Internet sites such as the one sponsored by the American Cancer Society. Thus, this series of articles provides the reader with a strong foundation of information to use when considering how to react to the issue of cancer, but it is by no means comprehensive. The information presented here is also limited by restricted access to expert medical sources. Top medical researchers and clinicians, especially oncologists, are understandably busy and have limited time to spend with journalism students. Such sources are included in each of the three articles, but additional access would have been beneficial. Perhaps the most significant limitation is the fact that there is no definitive answer as to why some people get cancer and others do not. Researchers are often unable to agree upon risk factors, cancer statistics and cancer treatments. This is a major cause of the very confusion that the series' research hoped to alleviate. In the absence of agreed-upon absolute answers, the series summarized what appeared to be the most relevant, logical and comprehensive answers.

Notes

¹ Richard Harkness, "Tomato-Rich Diet Could Reduce Cancer Risk" *Knight-Ridder/Tribune News Service* 9 March 2001; available from <http://www.highbeam.com/doc/1G1-71445739.html>; Internet; accessed 10 January 2007; Marilyn Marchione, "Study Says People at Risk for Colon Cancer Should Curb Drinking, Take Folic Acid," *Knight-Ridder/Tribune News Service* 13 March 2002; available from <http://www.highbeam.com/doc/1G1-92635688.html>; Internet; accessed 10 January 2007; "Cabbages 'Cut Lung Cancer Risks'," *BBC News* 27 October 2005; available from <http://news.bbc.co.uk/1/hi/health/4382382.stm>; Internet; accessed 10 January 2007; Luran Neergaard, "Obesity Linked to Multiple Cancer Risks," *The Boston Globe / the Associated Press* 24 August 2004; available from http://www.boston.com/news/nation/articles/2004/08/24/obesity_linked_to_multiple_cancer_risks/; Internet; accessed 10 January 2007; and "Cancer Risks Linked to Common Pollutant: Report Urges Stricter EPA Limits on Industrial Solvent in Drinking Water" *MSNBC / the Associated Press* 2 October 2006; available from <http://www.msnbc.msn.com/id/14064165/>; Internet; accessed 10 January 2007.

² Vice Admiral Richard H Carmona, "New Surgeon General's Report Focuses on the Effects of Secondhand Smoke," *U.S. Department of Health and Human Service* 27 June 2006; available from <http://www.hhs.gov/news/press/2006pres/20060627.html>; Internet; accessed 10 January 2007.

³ Ibid.

⁴ Ibid.

⁵ Tom Baranowski, Cheryl L Perry, and Guy S Parcel, "How Individuals, Environments, and Health Behavior Interact: Social Cognitive Theory," in *Health Behavior and Health Education: Theory, Research, and Practice*, eds. Karen Glanz, Francis Marcus Lewis, and Barbara K Rimer (San Francisco, California: Jossey-Bass: A Wiley Company, 1997), 156.

⁶ Ibid., 174.

⁷ Albert Bandura, "Social Cognitive Theory of Mass Communication," *Media Psychology* 3 (2001): 271.

⁸ Eleanor Singer and Phyllis M. Endreny, *Reporting on Risk: How the Mass Media Portray Accidents, Diseases, Disasters, and Other Hazards* (New York: Russell Sage Foundation, 1993), 3.

⁹ Jeannette M Trauth, "A Case Study of Health Risk Communication: What the Public Wants and What it Gets," available from <http://www.piercelaw.edu/risk/vol5/winter/trauth.htm>; Internet; accessed 29 December 2006.

¹⁰ Trauth, "A Case Study of Health Risk Communication," and Bandura, "Social Cognitive Theory of Mass Communication," 271.

¹¹ Trauth, "A Case Study of Health Risk Communication," 8.

¹² *Ibid.*, 9-10.

¹³ *Ibid.*

¹⁴ Trauth, "A Case Study of Health Risk Communication," and James D Shelton, "The Provider Perspective: Human after All," *International Family Planning Perspectives* 27, no. 3 (2001): 153.

¹⁵ Victor J. Strecher and Irwin M. Rosenstock, "The Health Belief Model," in *Health Behavior and Health Education* eds. Karen Glanz, Francis Marcus Lewis, and Barbara K. Rimer (San Francisco: Jossey-Bass: A Wiley Company, 1997), 42.

¹⁶ *Ibid.*, 43.

¹⁷ *Ibid.*, 43-44.

¹⁸ Julie Zawisza and Susan Bro, "FDA Announces Findings From Investigation of Foodborne *E. coli* O157:H7 Outbreak in Spinach," *FDA* 29 September 2006; available from <http://www.fda.gov/bbs/topics/NEWS/2006/NEW01474.html>; Internet; accessed 31 January 2007.

¹⁹ Michael Y Park, "E. Coli Outbreak Hurts Spinach Farming Industry, Restaurants," *FOXNews.com* 22 September 2006; available from <http://www.foxnews.com/story/0,2933,215257,00.html>; Internet; accessed 31 January 2007.

²⁰ *Ibid.*

²¹ Carole Tracy Orleans, "Preventing Tobacco-Caused Cancer: A Call to Action," *Environmental Health Perspectives* 103, suppl. 8 (1995): 149.

²² *Ibid.*

²³ These figures represent each agency's analysis of self-reported data from the 2005 National Health Interview Survey (NHIS) wherein respondents were asked "Have you smoked at least 100 cigarettes in your entire life?" and "Do you now smoke cigarettes every day, some days, or not at all?" See for example "Prevention & Early Detection: Tobacco and Cancer, Tobacco-Related Cancers Fact Sheet," comp. American Cancer Society 2007; available from http://www.cancer.org/docroot/PED/content/PED_10_2x_Tobacco-Related_Cancers_Fact_Sheet.asp

?sitearea=PED; Internet; accessed 31 January 2007; *Health, United States 2005: Chartbook on Trends in the Health of Americans*, comp. Centers for Disease Control and Prevention, National Center for Health Statistics, U.S. Department of Health and Human Services, (Hartsville, Md: Department of Health and Human Services, 2005), 33; *Health, United States 2006: Chartbook on Trends in the Health of Americans*, comp. Centers for Disease Control and Prevention, National Center for Health Statistics, U.S. Department of Health and Human Services, (Hartsville, Md: Department of Health and Human Services, 2006), 32; and “Cancer Prevention and Early Detection Facts and Figures 2005,” comp. American Cancer Society (Atlanta: American Cancer Society, 2005), 17; “Cigarette Smoking Among Adults—2002,” *MMWR, Morbidity, Mortality Weekly Report*, comp. Centers for Disease Control 53, no. 20 (2004): 427; “Tobacco Use Among Adults—United States, 2005,” *MMWR, Morbidity, Mortality Weekly Report*, comp. Centers for Disease Control 55, no. 42 (2006): 1145.

²⁴“Prevention & Early Detection: Tobacco and Cancer, Tobacco-Related Cancers Fact Sheet,” Donald R Shopland, “Tobacco Use and Its Contribution to Early Cancer Mortality with a Special Emphasis on Cigarette Smoking,” *Environmental Health Perspectives* 103, suppl. 8 (1995): 133, and Singer and Endreny, *Reporting on Risk*, 156-158.

²⁵ Ibid.

²⁶ “Prevention & Early Detection: Tobacco and Cancer, Tobacco-Related Cancers Fact Sheet.”

²⁷ Singer and Endreny, *Reporting on Risk*, 6.

²⁸ Ibid.

²⁹ Ibid., 159 and Trauth, “A Case Study of Health Risk Communication,” 7-9.

³⁰ Keller and Block, “Increasing the Persuasiveness of Fear Appeals,” 457.

³¹ Kenneth H. Beck and Arthur Frankel, “A Conceptualization of Threat Communications and Protective Health Behavior,” *Social Psychology Quarterly*, 44, no. 3 (1981): 215.

³² Punam Anand Keller and Lauren Goldberg Block, “Increasing the Persuasiveness of Fear Appeals: The Effect of Arousal and Elaboration,” *The Journal of Consumer Research* 22, no. 4 (1996): 457; Beck and Frankel, “A Conceptualization of Threat Communications and Protective Health Behavior,” 215; Baba Shiv, Julie A Edell, and John W Payne, “Factors Affecting the Impact of Negatively and Positively Framed Ad Messages,” *The Journal of Consumer Research* 24, no. 3 (1997): 293; and Bandura, “Social Cognitive Theory of Mass Communication,” 277.

³³ Beck and Frankel, "A Conceptualization of Threat Communications and Protective Health Behavior," 215 and Bandura, "Social Cognitive Theory of Mass Communication," 270.

³⁴ Brandon Johnson, "Advancing Understanding of Knowledge's Role in Lay Risk Perception," *Franklin Pierce Law Center* 1999; available from <http://www.pierce.law.edu/risk/vol4/summer/johnson.htm>; Internet; accessed 29 December 2006.

³⁵ Ibid.

³⁶ Baranowski, Perry, and Parcel, "How Individuals, Environments, and Health Behavior Interact," 163.

³⁷ Johnson, "Advancing Understanding of Knowledge's Role in Lay Risk Perception".

³⁸ Baranowski, Perry, and Parcel, "How Individuals, Environments, and Health Behavior Interact," 163.

³⁹ Ibid., 164.

⁴⁰ Keller and Block, "Increasing the Persuasiveness of Fear Appeals," 457; and Beck and Frankel, "A Conceptualization of Threat Communications and Protective Health Behavior," 215; and Shiv et al., "Factors Affecting the Impact of Negatively and Positively Framed Ad Messages," 293.

⁴¹ Ibid.

⁴² Keller and Block, "Increasing the Persuasiveness of Fear Appeals," 457.

⁴³ Beck and Frankel, "A Conceptualization of Threat Communications and Protective Health Behavior," 215 and Baranowski et al., "How Individuals, Environments, and Health Behavior Interact," 163.

⁴⁴ Julian Rappaport, "Community Narratives: Tales of Terror and Joy," *American Journal of Community Psychology* 28, no. 1 (2000): 4.

⁴⁵ Ibid.

⁴⁶ Kris Kissman and Ophelia A. Torres, "Incarcerated Mothers Mutual Support Groups Aimed at Reducing Substance Abuse Relapse and Recidivism," *Contemporary Family Therapy* 26, no. 2 (June 2004): 221.

⁴⁷ Ibid.

⁴⁸ Rappaport, "Community Narratives: Tales of Terror and Joy," 4.

⁴⁹ Ibid.

⁵⁰ Bandura, "Social Cognitive Theory of Mass Communication," 272; Rappaport, "Community Narratives," 4; and Kissman and Torres, "Incarcerated Mothers," 221.

⁵¹ Ibid., 274.

⁵² James O Prochaska, John C Norcross, and Carlo C DiClemente, *Changing for Good* (New York: Quill, 2002), 43-45.

⁵³ Ibid., 39.

⁵⁴ Ibid., 43.

⁵⁵ Ibid., 44.

⁵⁶ Ibid., 43-45.

⁵⁷ Joshua Fogel, Steven M Albert, Freya Schnabel, Beth Ann Ditkoff, and Alfred I Neugut, "Internet Use and Social Support in Women with Breast Cancer," *Health Psychology* 21, no. 4 (2002): 398. See for example "Centers for Disease Control and Prevention Home Page," *Centers for Disease Control and Prevention, U.S. Department of Health and Human Services* 2007; available from <http://www.cdc.gov>; Internet; accessed 22 January 2007; "healthfinder: Your Guide to Reliable Health Information," *Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services* 1997; available from <http://www.healthfinder.gov>; Internet; accessed 25 January 2007; and "Health Information," *National Institutes Of Health, U.S. Department of Health and Human Services*, 2007; available from <http://health.nih.gov>; Internet; accessed 22 January 2007.

⁵⁸ "ConsumerReports.org: Our Mission," *Consumers Union, BMJ Publishing Group* 2003; available from <http://www.consumerreports.org/cro/aboutus/mission/overview/index.htm>; Internet; accessed 16 February 2007.

⁵⁹ "Manage Your Health: How to Make the Best Decisions About Treatment," *ConsumerReportsMedicalGuide.org, Consumers Union, BMJ Publishing Group* 2003; available from <http://www.consumerreports.org/mg/decision-support/how-to-make-the-best.htm?resultPageIndex=1&resultIndex=1>; Internet; accessed 16 February 2007.

⁶⁰ "Manage Your Health: Choosing Treatments," *ConsumerReportsMedicalGuide.org, Consumers Union, BMJ Publishing Group* 2003; available from

<http://www.consumerreports.org/mg/decision-support/choosing-treatments.htm>;
Internet; accessed 16 February 2007.

⁶¹ “Manage Your Health: How to Make the Best Decisions About Treatment.”

⁶² “JupiterResearch Finds That Rising Costs and Complexity in Healthcare Will Spur Consumer Demand For Online Health Media,” *Business Wire* 3 October 2006, available from <http://www.businesswire.com>; Internet; accessed 17 February 2007.

⁶³ Suzanne Fox, “Online Health Research Is Widespread, but Few Check the Source and Date,” *Medscape General Medicine* 12 February 2007; available from <http://www.medscape.com/viewarticle/551520?src=mp>; Internet; accessed 21 February 2007.

⁶⁴ “JupiterResearch Finds That Rising Costs and Complexity in Healthcare Will Spur Consumer Demand For Online Health Media.”

⁶⁵ Barbara Friedman, *Web Search Savvy: Strategies and Shortcuts for Online Research*, (Mahwah, NJ: Lawrence Erlbaum Associates, 2004), ix, 156-157.

⁶⁶ Catherine M Ikemba, Claudia A Kozinetz, Timothy F Feltes, Charles D Fraser, Jr, E Dean McKenzie, Naeema Shah, and Antonio R Mott, “Internet Use in Families With Children Requiring Cardiac Surgery for Congenital Heart Disease,” *Pediatrics* 109 (2002): 419.

⁶⁷ Alan R Spitzer, “The Internet—A New Medical Problem or Invaluable Ally?” *Pediatrics* 114 (2004): 818 and Ikemba, et al., “Internet Use in Families,” 419.

⁶⁸ “A User’s Guide to Finding and Evaluating Health Information on the Web,” *Medical Library Association* 12 September 2006; available from <http://www.mla.net.org/resources/userguide.html#1>; Internet; accessed 21 February 2007; Donald AB Lindberg and Betsy L Humphreys, “Medicine and Health on the Internet: The Good, the Bad, and the Ugly,” *JAMA* 280, no.15 (1998): 1303-1304; and Vincent Kiernan, “Study Finds Errors in Medical Information Available on the Web,” *Chronicle of Higher Education* 12 June 1998 [LexisNexis]; available from http://web.lexis-nexis.com.libproxy.lib.unc.edu/universe/document?_m=e4d2b33682fd0e374bedae2f53c608aa&_docnum=1&wchp=dGLbVtz-zSkVb&_md5=022907c735dc3c08073b2025e377d3d9; Internet; accessed 27 February 2007, A25.

⁶⁹ Fox, “Online Health Research Is Widespread, but Few Check the Source and Date.”

⁷⁰ Lindberg and Humphreys, “Medicine and Health on the Internet: The Good, the Bad, and the Ugly,” 1304.

⁷¹ “Manage Your Health: How to Make the Best Decisions About Treatment,” *ConsumerReportsMedicalGuide.org*, *BMJ Publishing Group* 2003; available from <http://www.consumerreports.org/mg/decision-support/how-to-pick-the-best.htm>; Internet; accessed 16 February 2007.

⁷² Friedman, *Web Search Savvy*, 156-164.

⁷³ Edge, Harvey Zemp, interview by Waynette Morley, tape recording, 21 February 2007, Laurinburg, N.C.

⁷⁴ “Gerson Therapy: Healing Your Body with the Gerson Therapy,” *Gerson Institute* 2003; available from http://www.gerson.org/g_therapy/default.asp; Internet; accessed 19 February 2007 and Barrett, Stephen and Victor Herbert, “Questionable Cancer Therapies,” *Quackwatch* 6 July 2001; available from <http://www.quackwatch.org/01QuackeryRelatedTopics/cancer.html>; Internet; accessed 10 January 2007.

⁷⁵ “Operation Cure.all Nets Shark Cartilage Promoters.”

⁷⁶ “Elements of Cancer Genetics Risk Assessment and Counseling,” *National Institutes Of Health, U.S. Department of Health and Human Services* 18 January 2007; available from <http://www.cancer.gov/cancertopics/pdq/genetics/risk-assessment-and-counseling/healthprofessional>; Internet; accessed 10 February 2007.

⁷⁷ Evans et al., “Surgical Decisions Made by 158 Women with Hereditary Breast Cancer Aged 50 Years,” 1114–1116. S Green, “Immunoaugmentative Therapy. An Unproven Cancer Treatment,” *JAMA* 270 (1993): 1719, and Curt et al., “Immunoaugmentative Therapy,” 505.

⁷⁸ Green, “Immunoaugmentative Therapy. An Unproven Cancer Treatment,” 1719, and Curt et al., “Immunoaugmentative Therapy,” 505.

⁷⁹ “Medline Plus: Medical Encyclopedia-Renal Cell Carcinoma,” *National Institutes of Health, Department of Health and Human Services* 21 December 2005; available from <http://www.nlm.nih.gov/medlineplus/ency/article/000516.htm>; Internet; accessed 19 January 2007 and “What You Need to Know about Kidney Cancer: Symptoms,” *National Cancer Institute, U.S. National Institutes of Health* 2004; available from <http://www.cancer.gov/cancertopics/wyntk/kidney/page>; Internet; accessed 10 January 2007.

⁸⁰ “Understanding Kidney Cancer,” *Kidney Cancer Association* 14 January 2007; available from <http://www.kidneycancer.org/index.cfm?pageID=213>; Internet; accessed 10 January 2007.

⁸¹ “Renal Cell Cancer: Treatment General Information,” *National Cancer Institute, U.S. National Institutes of Health* 2007; available from <http://www.cancer.gov/>

cancerinfo/pdq/treatment/renalcell/healthprofessional/; Internet; accessed 10 January 2007.

⁸² “Understanding Kidney Cancer.”

⁸³ Ibid.

⁸⁴ Orleans, “Preventing Tobacco-Caused Cancer: A Call to Action,” 149.

⁸⁵ *A Dictionary of Epidemiology: Second Edition*, ed. JM Last and “Environmental Health and Toxicology: Toxicology Glossary,” *National Library of Medicine, National Institutes of Health* 28 November 2005; available from <http://sis.nlm.nih.gov/enviro/glossaryr.html>; Internet; accessed 26 February 2007.

⁸⁶ “Environmental Health and Toxicology: Toxicology Glossary.”

⁸⁷ See for example Bandura, “Social Cognitive Theory of Mass Communication,” 271; Keller and Block, “Increasing the Persuasiveness of Fear Appeals,” 457; Beck and Frankel, “A Conceptualization of Threat Communications and Protective Health Behavior,” 215; Shiv et al., “Factors Affecting the Impact of Negatively and Positively Framed Ad Messages,” 293; Trauth, “A Case Study of Health Risk Communication,” 9-10; and Shelton, “The Provider Perspective: Human after All,” 153.

⁸⁸ Keller and Block, “Increasing the Persuasiveness of Fear Appeals,” 457; Beck and Frankel, “A Conceptualization of Threat Communications and Protective Health Behavior,” 215; Shiv et al., “Factors Affecting the Impact of Negatively and Positively Framed Ad Messages,” 293.

⁸⁹ Johnson, “Advancing Understanding of Knowledge’s Role in Lay Risk Perception.”

Chapter Two
A Cancer Primer: Understanding Cancer's Causes and Treatments
and the Role of Risk Factors

Magazines, newspapers, the Internet, TV newscasts and documentaries broadcast new reports of cancer nearly every day. Incredible facts and contradictions fill the nation's headlines:

"Tomato-rich Diet Could Reduce Cancer Risk"

"Study Says People at Risk for Colon Cancer Should Curb Drinking, Take Folic Acid"

"Cabbages 'Cut Lung Cancer Risks'"

"Obesity Linked to Multiple Cancer Risks"

"Cancer Risks Linked to Common Pollutant: Report Urges Stricter EPA Limits on Industrial Solvent in Drinking Water"

This onslaught of almost daily reports of new drugs and treatments, new risk factors and promises of a cure can make it difficult for audiences to tell fact from fiction. Readers and listeners want and need to know: What causes cancer? Can I reduce my risk? What are the most important pieces of the cancer-fighting puzzle? Where is the latest, most accurate information? Much media reporting is superficial and does not go far enough to answer these questions, say doctors and victims of the disease.

Understanding Cells and Cancer: A Biology Refresher

Dr. Yuri Fesko, a hematologist and oncologist at Duke Hematology Oncology at Duke Raleigh Hospital in Raleigh, N.C., said that understanding cancer and the impact of risk factors begins with understanding that cancer's development is very complicated.

"Part of the reason that I became an oncologist is that I like the patients," Fesko said. "But it is also one of the fields where you truly understand the complexity of the human body." To understand cancer, people must understand DNA, Fesko said. "DNA is like a code for a computer that has millions and millions of layers, backup systems and control mechanisms."

The simplest definition of cancer is that it is unchecked or uncontrolled cell growth, so a visual picture of a cell is vital to understanding the path to cancer.

Although there are many more parts of a cell, it is only important to be able to visualize its center or nucleus and DNA's general location. It also helps to understand that DNA is made up of connected gene pairs.

Within the cell's nucleus or core is a single strand of DNA. This DNA strand is made of smaller segments called genes. The genes that make up DNA contain the instructions for running the entire body. By turning the correct gene pairs on or off, DNA tells the cell what to do and when to do it.

"I think that the big misconception in general is that there's just one gene [that causes cancer], and if we could figure out this one gene, then nobody would develop cancer," Fesko said. "There are a lot of genes that are involved in controlling cell growth and telling cells when to grow, when they should not grow and when they should die."

Genes produce the proteins that allow communication within and between cells. Fesko said these proteins give cells the ability to do things like resist the effects of poisons in secondhand smoke and repair the damages caused by improper diet and over-exposure to the sun. If changes in the gene, known as mutations, occur, then the cell loses its ability to understand the directions being given, which may cause it to grow and divide on its own.

The proteins tell DNA when to start the process of cell division. The DNA splits, and then after a complex process, it will copy itself so that there are two

identical strands of DNA, one for the mother cell and one for the new cell. The nucleus and all of the cell material divide to make two identical cells.

“Genes have a lot of mechanisms in place to protect them so that they don’t get damaged, but there can be genetic reasons why some of those mechanisms don’t work well,” Fesko said. “Or there can be exposure such as cigarette smoking or radiation exposure that causes more and more damage to those things that control the regulation of cell growth.”

During a cell’s normal life cycle, it’s told to grow, divide, and then, at a scheduled time, begin the sequence of death. If the gene is damaged by outside factors — obesity, sedentary lifestyle, exposure to hazardous chemicals — the gene may change slightly to accommodate. This mutation is passed to all of the cell’s future generations. That may mean that children inherit a mutated gene. In some instances, this change is good for the cell and for the species. It’s called evolution. But sometimes, the mutation turns off the switches signaling when to grow, divide or die, or it may leave on the switch that tells the cell to divide more often than it should. Those mutations can result in too many cells, which could lead to cancer.

Stopping the Mutations

Multiple back-up systems are in place to protect the human body from cancer. In fact, some gene pairs are specifically designed for these tasks. But Fesko warned that “eventually, if enough of these back-up systems fail, the regulation is out of control.” At that point, the damaged, mutated cell divides, and those two mutated cells divide, and those four mutated cells divide, and so on. And, each new generation of cells carries the mutation from the original damaged cell.

Only 10 percent of all cancers are caused solely by an inherited gene mutation. In most cases, it is an accumulation of mutations within one person that causes cancer. Assume for instance, that it will only take a combination of five or six mutations, accumulated over a lifetime, for a normal cell to become cancerous. Then it's only a matter of accumulating the right combination to switch on the cancer.

“The more you understand cancer, the more you appreciate that it's not one disease,” Fesko said. “For instance, we used to think that every woman who had estrogen-receptor positive breast cancer was the same, and that's not true at all. It's becoming increasingly apparent from the genetic testing that we can do now that all of these cancers have clusters of genes that can make them similar, but they are all different. And the way that we treat them is becoming increasingly different.”

New targeted therapies are emerging that are designed to stop cancer by stopping the mutations or blocking the processes caused by those mutations. These targeted therapies kill or slow the growth of cancer cells without unnecessarily killing normal cells. Robin Adriance, a nurse practitioner specializing in oncology at Hendersonville Hematology and Oncology in Hendersonville, N.C., said the theory behind many chemotherapy or radiation treatments is to kill cancer cells. She said it's OK if the treatment kills good cells as long as it also kills cancerous cells.

For instance, research in immunotherapy has found that inhibiting certain cytokines, or proteins produced by cells in the immune system, and kinases, or proteins that aid in communication between cells, stops or slows the growth of some forms of cancer, including certain types of leukemia, melanoma, kidney cancer and others. For example, a new kidney cancer drug, Nexavar, stops the process that

allows cancerous cells and tumors to find nutrients and oxygen and the process that tells cells to divide uncontrollably. Gleevec, a drug for certain leukemias and rare gastrointestinal cancers, targets the abnormal proteins that tell certain cells to divide continuously. Gleevec blocks the signal of the abnormal proteins so that the cells will divide normally.

Clinical trials, controlled human testing of the safety and effective dosage of drugs or treatment regimens, are now testing combinations of therapies, older chemotherapies and radiation, and combinations of the new targeted therapies.

“The thing that I think is most amazing that is coming out of cancer [research] is ... micro-array analysis,” Fesko said. “It basically takes a little bit of the cancer and you look at the clusters of genes that are over-expressed and sometimes under-expressed in that particular patient. You then compare it to other cancer patients, several thousand people, whose clusters are similar.”

Fesko said once an oncologist identifies patients whose gene clusters seem similar, he or she can then compare the treatments used and their success rates. This technology is allowing oncologists to use treatments that are tailored to specific patients and to specific gene mutations. The databases of information are growing, and micro-array analysis is already being used successfully in lung cancer patients, he said.

“We never really understood that there are different genetic reasons for the way [cells] act,” he said. “That’s a very different way of thinking about cancer.”

This technology has also been used to develop screening tests for early detection of some inherited gene mutations. One of the first tests developed for clinical practice was the Onco-type DS Assay.

“There are certain genes that have been clearly identified at this point that increase the likelihood of certain types of cancer,” Fesko said. “One of the more well-described ones is something called the BRCA 1 and the BRCA 2 mutations in breast cancer. They predispose women and men to a number of different cancers, including breast, ovarian and others.”

Fesko said the Onco-type DS Assay detects the BRCA 1 and BRCA 2 genes. A patient can combine these test results with his or her other risk factor information to make informed decisions about treatment strategies.

Sally Demshur, a senior behaviorist at MicroMass Communications in Cary, N.C., said the patient might still choose a policy of watchful waiting that includes increased mammograms and clinical breast exams or he or she may choose a pre-diagnosis mastectomy if there are compounding risk factors such as obesity, smoking or extensive family history of breast cancer.

“[Onco-type DS Assay] is for a select group of breast cancer patients, but it is the first step,” Fesko said. “This is a really complicated process, and we’re only in the infancy of doing it. Over my career, that is where this [research] will go. Increasingly, you’ll need your computer to make logical decisions on how to treat somebody. We’re figuring out things that we thought would never ever be possible.”

Predicting Cancer Using Risk Factors

After studying the lifestyles of thousands of people who have cancer, researchers have labeled certain behaviors or chemical exposures as risk factors. For instance, the national Centers for Disease Control and Prevention reported that smoking is the single most determining risk factor for lung cancer and is a major contributor to certain other cancers. That statement doesn't mean that smoking causes these cancers, but the overwhelming task of protecting itself from damage caused by the carcinogens in smoke might prove too much for the cell. The same applies to the damage resulting from exposure to cancer-causing chemicals and the damage caused by age, sunlight and environmental hazards. For instance, researchers don't know the cause or causes of kidney cancer or the switch that turns it on or off. But they do know that if risk factors, such as long-term dialysis, certain diseases, obesity, job-related exposure to asbestos or cadmium, and being a male between age 50 and 70, are present, an individual has a higher probability of a kidney cancer diagnosis.

"Kidney cancer is basically a growth gene in the kidney that has gone awry," Fesko said. He said to imagine a scenario wherein each cell has only seven mechanisms to protect it from damage. Over a lifetime, it isn't hard to imagine that a person could knock out those protective mechanisms one by one. "Every time that you knock one of these back-up systems out, you've got one less to protect you," he said.

As an example, think of kidney cancer protections like a punch card. If certain diseases run in the family — one punch. Smoking and a family history of kidney

cancer, one punch. Long-term dialysis treatment, punch. Obesity, punch. Male, punch. And one for those who are between 50 and 70 and another for job-related exposure to asbestos or cadmium. The more punches in the card, the higher the risk for kidney cancer.

“Eventually, it just takes one more change in that DNA to allow the cells to no longer respond to the normal growth mechanisms,” Fesko said. “The hormones that normally tell a cell to grow or stop growing, the cell no longer understands.”

So, if an individual has two or three of the risk factors that can’t be changed, such as age, gender and a family history of cancer, Fesko said that it might be a good idea to modify some of the changeable risk factors.

“Smoking is the big one, but there are environmental things that are not as easy to avoid,” he said. “Try to avoid pesticides, but if there was one thing that people could pick, it’s smoking. It’s a clearly identified risk factor that people voluntarily do.”

Risk factors for cancer are different for each type, but people can take steps, in addition to quitting smoking, to limit risk for all cancers: Increase physical activity, limit exposure to the sun’s ultraviolet rays, and limit alcohol consumption. Becky Hartt Minor, project director for the National Cancer Institute’s Southeast Region Cancer Information Service, Durham, N.C., said one of the most effective steps people can take is following early detection screening guidelines.

Counteracting Risk Factors

“Breast cancer screenings include mammography, self-breast exams and clinical breast exams,” Hartt Minor said. “A pap test for cervical cancer. Colonoscopies. Prostate exams for men. You can go to the U.S. Preventive Services Task Force to get the most accurate screening guidelines. You can monitor your own body through these early detection strategies.”

Although there is some disagreement, studies show that certain cruciferous vegetables — members of the cabbage and oil plant families, namely red cabbage and Brussels sprouts — may reduce the risk of kidney, prostate, bladder, colon, rectal and lung cancer. Little evidence exists, though, that other cruciferous vegetables, specifically broccoli and white cabbage, reduce cancer risk.

Dr. Ellen Willard, an oncologist at Pinehurst Medical Center in Pinehurst, N.C., noted, “A balanced diet now recommends five or more servings of fruits and vegetables a day.” And she cautions that, “It’s important to talk to your doctor before making any changes to your diet, weight or physical activity level.”

Even with all of the research in prevention, the CDC predicts that more than 1 million cancer cases will be diagnosed in 2007. That thought has spurred some people to kick it up a notch from just an extra helping of sauerkraut each week to more unusual and extreme actions. One such action is a detoxification regimen consisting of a combination of coffee enemas and a no-sodium diet. Proponents claim that this regimen supports the body’s immune response, but no scientific evidence suggests this treatment reduces cancer risk. The National Cancer Institute

warns that potential health hazards are associated with “excessive use of enemas of any kind.”

A more scientifically based treatment to reduce the possibility of certain cancers is pre-diagnostic surgery based on genetic testing. Genetic testing in high-risk situations, such as families where a mother or sisters have breast or ovarian cancer, especially if it resulted in death at a young age, allows women and men the option of removing breast tissue or ovaries before cancer is diagnosed. Fesko said a man or woman who has a strong family history of breast cancer and who tests positive for BRCA 1 and BRCA 2 will receive counseling to help him or her decide if surgery is the best choice.

People have used other less extreme but equally unusual treatments and therapies to avoid the cancer threat. For instance, shark cartilage, usually taken from the head and fins, is sold in powdered or pill form. Sales material for shark cartilage claims that it is a natural angiogenesis inhibitor. Angiogenesis inhibitors block a tumor’s ability to recruit new blood cells, which will provide nutrients to the cancer cells. The American Cancer Society reports that even though several clinical trials have attempted to assess shark cartilage’s effectiveness, no evidence supports the claims.

Many Internet advertisements for alternative treatments claim to cure cancer or slow its growth: immuno-augmentative therapy, apricot seeds, massive doses of nutritional supplements and macrobiotic diets. Physicians warn people to remember the old saying about believing statements that are too good to be true.

“There isn’t a particular vitamin that you can take that is going to decrease your risk,” Fesko said. “It doesn’t work that easily.”

When an advertisement or article claims to reduce cancer risk or cure cancer, Hartt Minor said that the best advice is to talk it over with a physician first. She said to look for current information that is credible and supported by evidence.

“So in my mind,” she said, “that means that you stick with those reliable sources, like the National Cancer Institute and your physician’s recommendations.”

Winning the Fight Against Cancer

In January 2007, the American Cancer Society released a report stating that Americans with cancer are living longer today. And although cancer is still the second-leading cause of death, cancer deaths are on the decline. In the *Chartbook on Trends in the Health of Americans*, the CDC reported that cancer deaths steadily increased until 1990, when they began dropping annually by about 1 percent. The total number of deaths continued to rise because the total population and the number of elderly in the population rose steadily. But in 2003, cancer-related deaths dropped by 2 percent. For the first time, that number more than offset the population increase. In 2003, the total number of cancer deaths dropped by 369, and the number of deaths decreased again in 2004 by 3,000.

The drops were most pronounced in lung, breast, prostate and colorectal cancer. Hartt Minor said the drops seemed to reflect Americans’ focus on developing healthier lifestyles and the realization of the need for early screenings.

“Coming from an educational point of view, I think that the American public is better educated around prevention and early detection screening guidelines,” Hartt

Minor said. “In general, I would say early detection and education contributed most to the drops.”

In 1970, the American people first declared war on cancer. President Richard Nixon answered their call with the National Cancer Act in 1971, which included increased funding for research and for programs to inform Americans about their risks and possibilities for prevention. Hartt Minor said the Cancer Information Service was established in 1976 to educate people about cancer prevention, risk factors, early detection, symptoms, diagnosis, treatment and research.

Nurse practitioner Adriance of Hendersonville, N.C., said that another reason more people are surviving cancer today is because doctors view it as a long-term condition rather than an acute illness, which can be cured and forgotten. Even after a full remission, physicians continue to scan for the cancer to spot recurrences earlier.

“Yes, we are making progress, and we are affecting the mortality rate,” Fesko said. “But I think that there’s tremendous amount of work that still needs to be done. The way that we treat cancer is going to be fundamentally different 20 years from now. People are living much longer, but I don’t think the war is going to be over any time soon.”

Living with Cancer Information

What began as a trickle in the 1970s has become a downpour. Now, the problem with cancer information is that it can seem overwhelming to evaluate such a large amount of information and determine its applicability to your life. The next two articles in this series, “One Man’s Cancer” and “Choosing to Live with Risk Factors,”

are about two men, Jimmy Jacobs and Zemp Edge, who exemplify just two of the many approaches people take when dealing with information about cancer and its risk factors.

Chapter Three
One Man's Cancer

Jimmy Jacobs, 69, has lived to see the discovery of the polio vaccine, home computers, the artificial heart, the barcode, cell phones and MP3 players. He has seen improved detection and treatment for cancer. For years, he has heard that lifestyle behaviors might increase the risk for cancer. But until he was diagnosed with kidney cancer, Jacobs simply didn't see how any of the recommendations for behavior changes would reduce his risk of contracting cancer. His reaction is normal, health care staff say.

The primary risk factors for renal cell carcinoma, a form of kidney cancer, are smoking, a family history of kidney cancer, long-term dialysis treatment, certain diseases, obesity, job-related exposure to asbestos or cadmium, and being a male between age 50 and 70.

Jimmy Jacobs has only two of the risk factors: age and gender. But Jacobs has renal cell carcinoma, a rare form of kidney cancer.

When Jacobs looks back on the months and years that he has had kidney cancer, he recalls that he has been confident, assured of a total remission.

"I never once thought, 'This is the end,'" Jacobs said. "Even when they told me, 'You've got kidney cancer.'"

Sally Demshur, a senior behaviorist at MicroMass Communications in Cary, N.C., said when faced with a health crisis such as a cancer diagnosis, a person may display a range of behaviors, from total disbelief to intense information-seeking. In addition, a person may move from one attitude to another during the crisis.

"After that overwhelming or numb feeling has subsided a little, an individual may be more inclined to take action," Demshur said. "The individual may start

searching for information related to cancer and treatment on the Web, in books or magazines or by talking to friends and family members.”

If there is a diagnosis, the behaviors can still cross back and forth between attitudes of “empowered and determined, to resigned and defeated,” Demshur said.

“A lot of that has to do with the physical symptoms from the cancer treatment,” she said. “During this time an individual wants to feel that he or she still has some degree of control over the body, [even] though it may not feel like it.”

The same need to feel in control extends to even a potential diagnosis where some risk factors might predict the likelihood of developing a disease. For example, a woman whose mother has been diagnosed with breast cancer may opt for genetic testing to determine whether she is at increased risk. At that point, she probably has done extensive research into her options, Demshur said, and is deciding between the wait-and-see approach and a pre-diagnosis mastectomy.

Prognosis: Dismal

Jacobs was diagnosed with renal cell carcinoma, usually referred to as RCC, in May 2003. RCC is one of the rarest forms of cancer, accounting for only about 3 percent of the more than 1 million cancer diagnoses each year in the United States. Jacobs’ diagnosis was one of about 32,000 new U.S. cases — mostly in men between 50 and 70 — diagnosed in 2003.

RCC is a silent threat with few early symptoms. Some diagnoses are made because of tumor discoveries during scans unrelated to the kidney, but many more go undiagnosed until the cancer’s spread makes it too late for surgery. Once the

cancer spreads beyond the kidney, patients have only a 5 percent to 15 percent chance of surviving for five years.

Jacobs was lucky. He had symptoms and went in for an immediate checkup. His doctor found the tumorous kidney and ordered surgery right away. But many others, more than 12,000 each year, die from RCC because detection comes so late.

In the beginning, his resolve held even though the surgeons and oncologists had no answers other than cutting the cancer out. The surgeons removed his right kidney, and then after the cancer spread to his lungs, they removed a portion of his right lung. Jacobs said he still believed that he would make his goal of living to be 105 years old.

Jacobs still works full-time as a roofing inspector for Tremco. In 1994, after just two years in retirement from a 35-year career at Dupont, Jacobs went back to work. His days are spent standing on a rooftop, inspecting the work of roofing contractors who use his company's products. He ensures that the work is done according to the product's specifications.

Work with Tremco has taken Jacobs throughout the United States, as far away as Waco, Texas, and to Brevard, N.C., little more than an hour or so from home. One day, at the end of the long drive from his home in Hendersonville, N.C., to a job site in Cincinnati, Jacobs noticed blood in his urine and called his urologist. He'd been treated for "some prostate trouble," and he thought the long drive might have irritated something.

The urologist was unavailable, and Jacobs' wife, Reba, said that might have been the best thing that happened to them in those first few days. Jacobs was told that Dr. Barry Bodie, a kidney specialist and surgeon who fills in at the practice, would have to see him.

A normal kidney is bean-shaped and about the size of a human fist. Reba Jacobs said the X-ray showed that Jimmy's left kidney was the "size of a grapefruit" and unnaturally shaped.

"I was sitting there in the room with tears streaming down my face when he said, 'You have kidney cancer, and it needs to come out right now,'" Reba Jacobs remembers.

Bodie scheduled emergency surgery, Jacobs said. He removed the kidney and told the Jacobses that the tumor was encased in the kidney and that he was sure he'd removed all of the potentially cancerous tissue. Bodie sent the tissue to the lab to reconfirm the cancer type and then ordered quarterly CT scans of the area. The scans would give doctors cross-sectional images of Jacobs' body to help chart the course of the cancer.

But the next scan revealed small spots on Jacobs' right lung; the cancer had spread, Jacobs said. Bodie referred Jimmy and Reba Jacobs to a pulmonary specialist, who consulted with a surgeon familiar with lung cancer. They decided the spots were large enough that surgical removal of the lower portion of the lung was the best course.

After surgery, Jacobs began seeing an oncologist in Hendersonville to discuss post-surgery treatment. Surgery is the primary treatment option for renal cell

carcinoma but could be considered too dangerous or complicated when tumors are small or numerous. In some patients, chemo-, hormone-, biological- and immuno-therapies have been used with some success to slow cancer's spread. But, in other cases, research has indicated that those drugs' severe side effects reduce the quality of life in the time that they would add to a person's life.

Jimmy and Reba Jacobs said they worried because surgery was the only treatment that the doctors had to offer.

"They were going to cut my lungs up as many times as I allowed it," Jacobs said. "But then I was going to be put up on a shelf to die."

Reba Jacobs, the more Internet and computer proficient of the two became the couple's leader in a search for a treatment. She read about interferon alpha and interleukin-2 therapy, the most commonly prescribed drugs and the only treatments available to slow or stop the spread of kidney cancer. Interleukins and interferons are called immuno-therapy because they act as stimulators and regulators of the immune system. These immuno-therapies help the normal white blood cells recognize mutated cells as an infection. Both can be prescribed as a high-dose injection that is given in a clinic or hospital or as a low-dose injection that the patient administers at home. The side effects range from headache, fatigue, and muscle pain to convulsions, dizziness, hair thinning, and depression, among others.

Treatment Options and Emotions

As the expectation for a cure dwindled, Jacobs' approach to treatments changed. Before cancer, Jacobs had strongly resisted taking pills or medication, no

matter how severe his pain. Even today, he scoffs at the use of pills or medical intervention unless it's absolutely unnecessarily.

When Robin Adriance, a nurse practitioner, scolded Jacobs for not getting his flu shot, he brushed her concerns aside. He assured her that his morning zinc and cranberry juice were all he would need.

"I don't get colds," he said. "Ever since I started taking the zinc, I don't get colds like other people."

But, his attitude toward pills and vitamins changed after the lung surgery in October 2004. During Reba Jacobs' Internet research, she found articles claiming that apricot seeds could help the body fight and stop certain cancers, including kidney cancer.

Apricot seeds were said to be high in vitamin B17, supposedly a source that would boost the immune system and allow the body to fight cancer. Vitamin B-17 metabolizes in the human body to form cyanide, a chemical that promoters say selectively kills cancer cells while leaving normal cells healthy.

Credible scientific research has found no evidence that apricot seeds fight cancer, but the couple was anxious for a cure. Reba Jacobs also unearthed a vitamin supplement regimen that purported to enhance the immune system and support nutrition. So Jacobs started taking vitamins and eating apricot seeds.

But even with the supplements and apricot seeds, the cancer progressed. The December 2005 scan revealed spots littered across both lungs. But they were too small and plentiful to risk surgery. So, Jacobs increased his daily amount of vitamins and apricot seeds.

Vulnerability is a hard feeling to live with, and it's a difficult subject to discuss with others, Jacobs said. He doesn't like to talk about times when he felt vulnerable, times when he was anxious or afraid. But he said that during the December 2005 appointment he was adamant with medical staff that a treatment must be out there, something that would stop or slow the cancer.

"It takes a whole lot for me to give up; in fact, there's not many things that I've ever given up on," Jacobs said.

Two months later, in February 2006, three months after the FDA approved a new drug for the treatment of kidney cancer, Reba and Jimmy Jacobs learned about Nexavar. Nexavar, a significant development in oncology, is designed to target cancerous cells specifically. In clinical trials, on average, treatment with Nexavar doubled the amount of time that kidney cancer did not grow or spread. This drug was the first significant advancement in kidney cancer treatment in the past 10 years.

Although the amount of time that the tumor reportedly remained stable was a marked improvement over interleukin-2 and inferno alpha, the potential side effects were serious. Even though Nexavar's a targeted therapy, whenever cancerous cells are attacked, other reactions can be expected in the body.

Despite the risks, Jacobs said he was more relieved by finding a treatment than he was worried about possible side effects or cost.

"I started taking the Nexavar because the cancer was growing even though I was taking that stuff [nutritional supplements] and eating apricot seeds," Jacobs

said. "I did everything they'd [the vitamin distributors] said to do, but the cancer was still growing."

Bayer, the drug's manufacturer, paid for the \$4,000-per-month medication for the first three months, but the couple didn't qualify for continued support. Reba Jacobs said Medicare and Jacobs' insurance plan took over, but the couple had to incur hefty co-pays and deductibles. That meant that, even at 69, Jacobs would need to continue working. The couple worried that he wouldn't be well enough to work through the side effects.

Jacobs continued to work full-time, except for the annual six-week vacation the couple took from mid-February to the first of April. He worked even while undergoing cancer therapy. Beginning in April, he worked 12-hour days for 13 days at a time. The roofing team would be given a two-day break, which Jacobs only extended if it was time for his quarterly scan.

Beyond the Drug's Side Effects

Reba and Jimmy Jacobs have been together for more than 25 years. In the beginning, his hair was red, and he had the fiery personality to match. The red hair of his youth turned blond, and eventually white, years ago. And after a few weeks of Nexavar therapy, his hair thickened and frizzed into a fine white Afro. That was one of the more easily tolerated side effects. Others weren't so mild. But when he looks at the side effects in hindsight, Jacobs tries to make light of his symptoms.

"Everybody talks about feeling bad," Jacobs said. "I didn't feel bad. Sure, my feet hurt, but I didn't feel bad."

But according to his wife, Jacobs was frighteningly ill during the first few weeks of therapy. Jacobs' treatment started during the annual vacation in Fort Myers, Fla., and Reba Jacobs said that he stayed in the recliner all day because he didn't have the strength to leave it. And Jacobs' feet were so swollen and sore that he had to lean on her when they went to the grocery store. She said at times he seemed worried about being left alone, so she limited the trips to town.

"He didn't even want me to leave the trailer," Reba Jacobs said.

The couple began to worry about the severity of the side effects when the skin on Jacobs' head became so painful that he couldn't allow anything to touch it.

"He couldn't even put his head on a pillow," she said. "The insides of his ears swelled, and he ran a high fever."

When the couple reported Jacobs' severe side effects, his doctor cut the dosage in half.

The side effects continued, but on a slightly more manageable scale. Jacobs continued to take the Nexavar, the heavy doses of the nutritional supplement and the apricot seeds throughout the most painful side effects. He knew that the drug was causing the pain, but the alternative was unthinkable.

"There was really no choice," he said. "I take it or I die. When you know what the alternative is, it makes the other choices easy."

Finally, in November 2006, eight months after starting Nexavar and two years and seven months after his diagnosis, Jacobs had his second clear scan. His cancer was in remission.

“You’ve had two good scans now,” Adriance said. “Now is a good time to stop taking the Nexavar. When you know you have an effective agent, and no real measurable disease, that’s a good time to stop therapy, because then if you have a recurrence, you still have an active agent down the road.

“We hope that your cancer has regressed to the point that you’re going to have to have something phenomenal happen inside of you to get it switched back on again,” she said.

His treatment plan became one of “watchful waiting.” He would still undergo quarterly scans to keep an eye out for kidney cancer’s recurrence, but the certainty of death seemed more distant. Jacobs still continued taking the nutritional supplements, though at a much lower dose.

“I know how close I’d come,” Jacobs said.

Reba said that since a week after stopping Nexavar, her husband hasn’t had to wear corn pads to protect the calloused sores on his feet. His stoicism has held throughout most of this experience remains; he still doesn’t like to talk about his pain. He doesn’t want to appear to complain. When asked how he’s doing, he only said, “It’s getting a lot better.”

And Jacobs’ hair will probably come back in his normal silky white.

“When it comes back, it’ll be red,” Jacobs joked.

After living through a cancer for which he had only two known risk factors, age and gender, Jacobs is more understanding and tolerant of those who defy researchers’ evidence and continue to smoke or overeat.

"Sis has smoked for years," he said. "But she's lived through breast cancer, and she lives alone now, too, since John [her husband] died. I asked her about her smoking, and she said, 'It's one thing I enjoy.' I just can't see that much wrong with it now."

Jimmy Jacobs looks at some things differently now, like the value of medications and living a healthy life every day. He's more tolerant of other people's outlooks and perspectives. And his belief that he would make it has remained steady.

"I'm gonna make that 105 yet."



Chapter Four
Choosing to Live with Risk Factors

When it comes to risk factors for cancer, at 49, Harvey “Zemp” Edge has plenty: He’s on the upper end of the age range researchers have defined as high risk for cancer — 50 to 70; he’s smoked since he was 16; he admits to a high fat diet; and he has an extensive family history of cancer. But Edge has no cancer.

Edge is the father of four children, including 29-year-old Harvey Zemp Edge III, and has one granddaughter and another on the way. He and his wife, Tina, and son Brandon, 15, live in a brick ranch on the Edges’ five acres in Laurinburg, N.C., less than 15 minutes from the South Carolina border.

Edge and his father, the first Harvey Zemp, farm about 3,000 acres of this sandy southern North Carolina soil. Edge said they are able to keep the fields producing nearly year-round because the climate and soil in the southeast corner of the state allow them to farm a variety of crops, including cotton, soy beans, corn, tobacco and wheat. “Farming is what I do, but I stay busy,” he said.

About 10 years ago, Edge had a brush with cancer. He noticed a bright red sunburn everywhere on his body: on his ears, between his fingers, under his shirt. His physician referred him to an oncologist in Laurinburg who told the Edges that he probably had polycythemia.

“It wasn’t really cancer,” Edge said. “It was just a blood disorder.” Despite that scare and Edge’s other risk factors, he chooses to dismiss the notion that he might contract cancer and as a result, Edge pays little attention to cancer risk information.

Risk factors are not necessarily the causes of a cancer or disease, but they are reliable predictors of future disease. Sally Demshur, a senior behaviorist at MicroMass Communications, in Cary, N.C., said that even with the amount of cancer

risk information available, some people, like Edge, will choose to risk their future health in spite of the ability to make healthier choices. Many people will weigh today's perceived quality of life against tomorrow's unknown quality of life when making that decision, she said.

Demshur noted that Edge's response is a clear example of what so many behaviorists know: "Knowledge alone does not produce behavior change."

Learning about Cancer's Potential

Tina Edge was concerned. She said doctors told them that polycythemia has no cure and can lead to a form of leukemia. Dr. Yuri Fesko, a hematologist and oncologist at Duke Hematology Oncology at Duke Raleigh Hospital in Raleigh, N.C., said polycythemia occurs as a result of a mutation of the stem cells that make blood cells. This mutation results in higher numbers of red blood cells. He said the mutation tells the blood cells to divide more often than they should. Edge's oncologist prescribed bloodletting, or phlebotomy, the standard treatment for polycythemia. Although phlebotomy does nothing to cure polycythemia, it reduces the volume of blood in the system so that the strain on the heart and blood vessels is lessened, at least temporarily.

Edge was indifferent to the diagnosis and the treatment. "I never missed a lick," he said. "It never even stayed in my mind." Edge felt that his mother and father's longevity and vitality ensured a lasting good health for him.

"My mother and father are both 75 years old and fit as a fiddle," he said. "Daddy works every day. He don't miss a lick."

His parents' vigor is one good indication of Edge's future health. But there are many possible results of the combinations of Edge's family health history and his health decisions could produce other results. And Edge's parents represent only a small portion of his family health history.

"I had one first cousin, Tammy, fit as a fiddle," Edge said. "Went to the doctor, and she was eat up with lung cancer. I had an aunt — Erma — that died of colon cancer. Another first cousin has non-Hodgkin's lymphoma. And Archie, Tammy's older brother, has lung cancer."

"He has lots of cancer on his mama's side," Tina Edge added.

"But I mostly took after my daddy's," Edge joked.

In addition to an extensive family history of cancer, Edge admits to a high fat diet and has smoked for most of his lifetime. Fesko said Edge's statistics usually add up to an increased risk for developing many forms of cancer, which may include colon, prostate and kidney cancers.

Doctors: Variety and Moderation May Be Key

Dr. Donald Ingber, professor of pathology at Harvard Medical School and Children's Hospital Boston, said that researchers now know that cancer occurs as a result of a series of changes to the human cell that have occurred over a person's lifetime. So, although Edge is lean now, his high fat diet could be causing cell damage that could lead to a future cancer diagnosis. However, Ingber said no definitive studies outline a diet that reduces a person's risk of cancer.

"I have not seen to my knowledge any clear cut demonstration that any particular nutrients or vitamins really help for cancer," he said.

But evidence supports moderation. The Centers for Disease Control and Prevention’s “National Health and Nutrition Survey of 1999 to 2000” found that 64 percent of Americans surveyed were overweight to obese, and 31 percent were obese. That number, up 17 percent since 1980, shows an alarming trend in the United States, and the CDC reports an obesity epidemic. A recent study — “Preventing Cancer, Cardiovascular Disease, and Diabetes: A Common Agenda for the American Cancer Society, the American Diabetes Association, and the American Heart Association” — might have one important answer for people looking for healthy diet guidelines. The study reported that, for many Americans, losing weight may reduce the risk of cancer because “overweight or obese individuals who lose weight intentionally have reduced levels of circulating glucose, insulin, bio-available estrogens and androgens,” all of which increase the risk for diseases, including cancer.

Somewhat contrary to Ingber’s statement about no evidence of cancer risk reduction associated with diet, Fesko pointed out research that some vegetables and fruits, especially berries, contain antioxidants that help to protect the plants from the same cancer-causing damages that harm human cells.

Fesko said some research supports the same cancer protection in humans. He said studies have shown that a reduced risk of prostate cancer in a population of men who have a diet rich in tomatoes or real tomato products. Researchers at the University of Chicago and University of Illinois at Chicago found that lycopene, an antioxidant found in tomatoes, not only reduced future risk of prostate cancer and certain breast cancers, in some cases the damages were reversed. The study found

that people must eat tomato products, though, and not a lycopene supplement to get the benefit.

“There isn’t a particular vitamin that you can take that is going to decrease your risk,” he said. “It doesn’t work that easily. If we knew what it was, it would be much easier.”

Ingber and Fesko agree that, although the search continues, researchers have not yet found a winning combination of vitamins and minerals to stop cancer or reduce the risk for cancer. “But, I’m a believer in moderation in things as the key,” Ingber said.

Treating Blood Disorders

Edge doesn’t put as much stock in the merits of a well-balanced diet or increased physical activity as researchers do. And he scoffs at the seriousness of his cancer risk. He said that it isn’t something to worry about, even though he had phlebotomies twice a week.

When a specialist at UNC Hospitals ran tests on Edge’s blood to confirm or deny polycythemia, the tests revealed erythrocytosis, which meant that Edge had a high red blood cell count.

Fesko said erythrocytosis can occur when the body’s tissues think there isn’t enough oxygen. That may trigger extra production of red blood cells, the body’s oxygen carriers. He said erythrocytosis could be caused by smoking, exposure to carbon monoxide, kidney cancer, lung disease or any other event or circumstance that would persistently rob the body of oxygen.

Ordinarily, a physician's first objective for a patient who has erythrocytosis is to find the underlying cause and try to eliminate it, Fesko said. The physician would investigate the patient's personal habits and living conditions to check for such things as tobacco use or carbon monoxide leaks from home or work furnaces. He said phlebotomy would be used only as last resort to keep blood counts in the normal range.

"The problem when [red blood cell counts] get high is that there is an increased incidence of stroke, heart attack and all kinds of other cardiovascular diseases," Fesko said. "But the main thing [doctors] worry about is stroke."

The physicians at UNC Hospitals couldn't tell the couple what was causing Edge's erythrocytosis. "They said that the best thing to do was to go and let them draw blood and throw it away," Tina Edge said. "So he'd pay \$170 to let them throw blood away."

But, she said, the doctors thought Edge's smoking might be making matters worse at the very least, so she insisted that he try to quit. Because of the diagnosis and his wife's insistence, Edge went without a cigarette for more than 30 days.

"But then he started sneaking and smoking, and then I started pitching a fit," she said. "He'd just about eat a cigarette when I'd walk up on him." She said Edge's smoking began again in earnest.

Then the erythrocytosis went away as mysteriously as it appeared. Edge said he believes that its disappearance was because of a home remedy he tried. He said one of his friends told him that drinking a shot of whiskey each night would help thin the blood. So, each night Edge would pour a little bit into a glass of iced Coke.

Whatever the reason, Tina Edge said that he hasn't had need for a phlebotomy in six or seven years.

"He gets his blood checked every six months, though," she said. "They stay on top of it."

Living with Risk Factors

The good thing is that although it was a frightening event, Fesko said erythrocytosis does not increase Edge's risk for cancer. However, Edge's smoking could still cause erythrocytosis, and smoking still increases his risk for cancer. Fesko said. "If there was one thing that he could do to reduce his risk, it would be stop smoking."

Edge said that he smokes about a pack — about 20 cigarettes — a day. "I've probably been smoking 30, 40 years," he said. "I was 16 when I started." He admitted that cancer risk information has had some impact on his behavior. He said he doesn't smoke around his 1-year-old granddaughter or his pregnant daughter-in-law. But risk news hasn't made enough of an impact on him to change his smoking behavior entirely. Edge changed his smoking behavior temporarily to ease his wife's worry, but he did not see the benefits of breaking his tobacco addiction once and for all.

A decision to make a lasting and meaningful lifestyle change can be based upon a variety of conditions or circumstances. Demshur said for some, it takes a crisis, like a family member's death or a cancer diagnosis. Information providers call this a "teachable moment." She said teachable moments are those when information such as that related to cancer risk seems relevant to a person, and he or she will

see that the change is more valuable than his or her perception of the current quality of life.

For others, Demshur said acceptance and application of the information might depend upon receiving the information in a less traditional way. Even though most people trust their healthcare provider, she said some people are more open to change when a close friend talks about healthy behavior. For instance, Edge isn't a drinking man, but he began drinking a shot of whiskey every night because a friend recommended it as a blood thinner.

Demshur said that some people who respond to this kind of delivery might change unhealthy behaviors if a friend who's had a cancer scare invites that person to change. "There are some great studies about cancer risk communication in non-traditional settings, like salons and barbershops here in North Carolina," Demshur said. "The hairstylist actually ends up talking to the person about cancer and goes through the education process with them."

Tough Habit to Break

As for quitting, like many smokers, Edge said he could quit his lifelong habit easily enough if he felt the need. He said he doesn't feel that the cigarettes have that much of a hold on him.

"I can do whatever I have to do," he said. "I mean I've got that much self-esteem, probably, that I can do it. And I'd put the priorities in line, but right now they aren't in line on that part.

"I've spent money trying to quit," Edge said. He said he went to a hypnotist to cure his desire to smoke, but it didn't work for him. He realizes he has to want to quit

more than he wants to smoke. And right now, he doesn't want to quit. Edge pointed to his head. "In the end," he said, "if it ain't up here, you won't quit."

The Centers for Disease Control and Prevention's analysis of answers to the "2005 National Health Interview Survey" found that 21 percent of Americans smoke; that's about one out of every five. Fesko said that smoking is the one risk factor that everyone should avoid.

"It's a clearly identified risk factor that people voluntarily do," he said. "Some of the people that I treat are young enough that they've known the whole time that they've smoked that it is a clearly identified risk factor. I think that if we were going to make one huge difference that would be it."

But quitting is hard, and so for smokers like Edge, the reason for quitting needs to be more tangible than reducing the risk of a possible future cancer diagnosis. According to the American Cancer Society, a smoker's body begins to heal within 20 minutes of the last cigarette, when the nicotine and cancer-causing chemicals begin to leave the bloodstream. Within 12 hours of quitting, the carbon monoxide levels in the blood go back to normal. Sometime within two weeks to three months, a former smoker's lungs function better and circulation improves. In as little as one month, the coughing and shortness of breath decrease and then vanish.

According to the American Cancer Society, not only is the risk for cancer and coronary heart disease significantly reduced, but former smokers say that they have a higher quality of life because their sense of smell returns and food tastes better. Former smokers are no longer winded by ordinary activities. They have a better self-reported health status, and they have fewer cold and flu viruses.

Steps to Changing Behavior

A person's approach to behavior change because of cancer risk information can fall into one of the five Stages of Change first explained by psychologist James Prochaska. Prochaska theorized that the route to behavioral change involved pre-contemplation, contemplation, preparation, action and management, Demshur said. "It seems like [Edge] is definitely in the pre-contemplation stage [not thinking about changing in the next six months]," she said.

She said that someone in the pre-contemplation stage would need to see the benefits of changing his behavior and how those benefits would directly translate to his life. "You also have to find a way to minimize the cost or his perception of the cost," Demshur said. "Costs, such as it's a pain to take medicine, it interferes with his philosophy of live and let live, etcetera."

For now, Edge has stacked it all up, side by side. He has a family history of cancer, he smokes and he admits to eating a high fat diet. Edge can't change his family cancer history or age to reduce his risk, but he could change his diet to ward off possible weight gain as he ages and he can stop smoking. Both behaviors would reduce his risk.

But Edge said that he doesn't think the behavior change and its possible reduction in risk are worth the day-to-day reduction in quality of life that he would experience if he changed those behaviors. He said that his honest opinion about all of the news encouraging people to quit smoking, eat a healthier diet and add more physical activity is that people should just do what they want to do.

“What’s good for you today is going to be bad [for you] tomorrow,” he said.
“That’s the way I do. I eat what I want to. My cholesterol was borderline, and I told him to give me the pill because I love my oysters. I love my shrimp. Those two are the highest things in cholesterol that you can eat. I eat what I want to eat.

“When I go, I’m going,” he said. “I’ve already got that in my mind.

Chapter Five
Risk Sidebar: Information and Misinformation
and
Graphic: Simplified Explanation of Cell Division

Information and Misinformation

More people than ever before are searching for health information on the Internet, but experts note that people need to be aware of the reliability and quality of that information.

In 2006, the *Pew Internet and American Life Survey* reported that 115 million Americans searched for health information in at least one of 17 health categories, including diet, exercise or fitness, prescription or over-the-counter medications and experimental treatments or medicines. Of those, only 15 percent said that they always check the source and credibility of the information.

Dr. Ted Gansler, director of medical content at the American Cancer Society, said most people don't research cancer until it directly affects them or someone with whom they're close. That may mean that the searchers aren't savvy in medical terminology or in medical research, he said.

"I think it's important to start with a prominent organization with information you trust, an organization that is going to be objective about the information and scientifically competent to report on the condition," Gansler said. He recommended the American Cancer Society, the Centers for Disease Control and Prevention, major cancer centers, and organizations related to specific cancer types as first stops in searching for cancer information.

Gansler said one of the most important measures a reader can take is to ensure general agreement among the sources. Compare findings of studies and recommendations of researchers. Most credible, authoritative medical research providers include references and additional resources to corroborate their material

and provide steps to more in-depth research. For specific answers about researching medical information, Gansler suggested www.patientinform.com.

Barbara Friedman, assistant professor at the School of Journalism and Mass Communication at the University of North Carolina at Chapel Hill and former reporter, wrote in her book *Web Search Savvy: Strategies and Shortcuts for Online Research* a list of important tips for testing the credentials of Web sites. Friedman cautions that the Internet is an open medium, so anyone can place material there, and some of the information might not be as reliable as you think.

Her tips include:

- How reliable is the domain on which the site is hosted? For instance, .gov and .mil are considered the most reliable, followed by .org, .net and .com. Friedman wrote that readers should keep in mind that, although .edu sites hosted by a university, are among the most trusted, they can also be student project Web sites.
- How current is the information? Most credible sources include a date, and in some cases, time of last update somewhere on the page.
- Who is responsible for the information; is the author clearly identified? Make sure that the author or sponsoring organization is named.

Becky Hartt Minor, project director for the National Cancer Institute's Southeast Region Cancer Information Service, said that when a person is looking for information about cancer prevention, risk factors and treatment, it's very important to have information that is supported by evidence. Hartt Minor points to the National

Cancer Institute's Web site for valuable tips for evaluating information. NCI, a branch of the U.S. National Institutes of Health, is the government's principal agency for cancer research and training.

While searching, NCI recommends these tips:

- Limit your searches to respected cancer researchers such as government organizations, non-profit research facilities, advocacy organizations and professional organizations, like the Society of Clinical Oncology.
- Understand the motivations of the information provider. Commercials, infomercials or Web sites hosted by for-profit organizations may not provide a true picture. Medical myths and misinformation may be more effective selling points than valid evidence-based research.
- Talk it over with your healthcare provider. Hartt Minor recommends clearing everything through your most reliable and trusted resource, your healthcare provider.

The National Cancer Institute also provides a detailed list of credible, evidence-based information and support providers. The organizations represented are among the nation's top research institutions. Here are just a few to help in your search:

- National Cancer Institute, a division of the U.S. National Institutes of Health, coordinates and collaborates with the nation's industries, researchers and medical professionals to provide cancer research information: www.cancer.gov

- U.S. Preventive Services Task Force, sponsored by the Agency for Healthcare Research and Quality, is a panel of independent experts who evaluate scientific evidence and develop recommendations for cancer screenings and prevention: www.ahrq.gov/clinic/prevenix.htm
- People Living with Cancer, sponsored by the American Society of Clinical Oncology, is current, oncologist-approved information. The information is peer-reviewed by more than 135 medical professionals and patient advocates before being published online: www.plwc.org
- Centers for Disease Control and Prevention, sponsored by the U.S. Department of Health and Human Services: www.cdc.gov
- The Journal of the American Medical Association (JAMA), the official publication of the American Medical Association. A panel of medical and scientific peers review the research articles to ensure their accuracy: jama.ama-assn.org
- American Association for Cancer Research, founded by physicians and scientists to further cancer research: <http://www.aacr.org>
- American Cancer Society, a non-profit, volunteer organization devoted to cancer research and prevention: <http://www.cancer.org>

Simplified Explanation of Cell Division

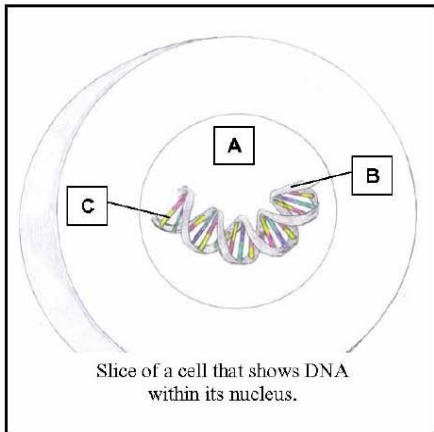


Diagram 1

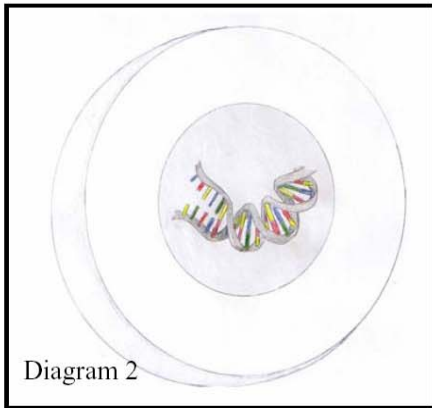


Diagram 2

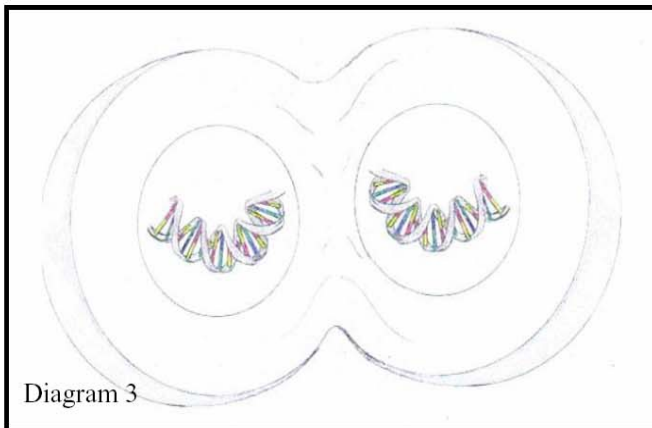


Diagram 3

Diagram 1 shows a very basic drawing of a slice of a human cell. Although there are many more parts, it is only important to be able to visualize a cell, its center or nucleus (A) and DNA's (B) general location. It also helps to see that DNA is made up of connected gene pairs (C), shown in red, yellow, green and blue.

Proteins, created by certain gene pairs, tell DNA when to start the process of cell division. In Diagram 2, DNA is beginning the process of division. The DNA splits, and then after a complex process, it will copy itself so that there are two identical strands of DNA, one for each of the two resultant cells. The

nucleus and all of the cell material divide to make two identical cells (Diagram 3).

BIBLIOGRAPHY

A Dictionary of Epidemiology: Second Edition, ed. JM Last (New York: Oxford University Press, 1988).

"Apoptosis," *Wikipedia* available from: <http://en.wikipedia.org/wiki/Apoptosis>; Internet; accessed 24 November 2006.

"A User's Guide to Finding and Evaluating Health Information on the Web," comp. *Medical Library Association* 12 September 2006; available from <http://www.mlanet.org/resources/userguide.html>; Internet; accessed 24 February 2007.

Austin S, EB Dale, and S DeKadt, "Long-term Follow-up of Cancer Patients Using Contreras, Hoxsey and Gerson Therapies." *Journal of Naturopathic Medicine* 5 no. 1 (1994):74-76.

Bandura, Albert, "Social Cognitive Theory of Mass Communication," *Media Psychology* 3 (2001): 265–299.

Baranowski, Tom, Cheryl L Perry, and Guy S Parcel, "How Individuals, Environments, and Health Behavior Interact: Social Cognitive Theory," in *Health Behavior and Health Education: Theory, Research, and Practice*, eds. Karen Glanz, Francis Marcus Lewis, and Barbara K Rimer (San Francisco: Jossey-Bass: A Wiley Company, 1997), 153-178.

Barrett, Stephen, and Victor Herbert, "Questionable Cancer Therapies," *Quackwatch* 6 July 2001; available from <http://www.quackwatch.org/01QuackeryRelatedTopics/cancer.html>; Internet; accessed 10 January 2007.

Beck, Kenneth H, and Arthur Frankel, "A Conceptualization of Threat Communications and Protective Health Behavior," *Social Psychology Quarterly* 44, no. 3 (1981): 204-217.

"Behavioral Risk Factors," *National Cancer Institute, U.S. National Institutes of Health* available from http://understandingrisk.cancer.gov/learn/factor_behavioral.cfm; Internet; accessed 24 February 2007.

"BMI — Body Mass Index: Adult BMI Calculator: English," *Centers for Disease Control and Prevention, U.S. Department of Health and Human Service* 8 May 2006; available from http://www.cdc.gov/nccdphp/dnpa/bmi/adult_BMI/english_bmi_calculator/bmi_calculator.htm; Internet; accessed 4 March 2007.

"Cabbages 'Cut Lung Cancer Risks'," *BBC News* 27 October 2005; available from <http://news.bbc.co.uk/1/hi/health/4382382.stm>; Internet; accessed 10 January 2007.

“Cancer Prevention and Early Detection Facts and Figures 2005,” comp. American Cancer Society (Atlanta: American Cancer Society, 2005).

“Cancer Risks Linked to Common Pollutant: Report Urges Stricter EPA Limits on Industrial Solvent in Drinking Water,” *MSNBC/The Associated Press* 2 October 2006; available from <http://www.msnbc.msn.com/id/14064165/>; Internet; accessed 10 January 2007.

“Cancer Risk: Understanding the Puzzle,” comp. *National Cancer Institute, U.S. National Institutes of Health* available from <http://understandingrisk.cancer.gov/>; Internet; accessed 24 February 2007.

Carmona, Richard H, “New Surgeon General’s Report Focuses on the Effects of Secondhand Smoke,” *U.S. Department of Health and Human Service* 27 June 2006; available from <http://www.hhs.gov/news/press/2006pres/20060627.html>; Internet; accessed 10 January 2007.

“Cell Function: Apoptosis Definitions,” *Enterprise Vocabulary Server, National Cancer Institute, U.S. National Institutes of Health*, available from <http://nci.meta.nci.nih.gov/>; Internet; accessed 24 February 2007.

“Centers for Disease Control and Prevention Home Page,” *Centers for Disease Control and Prevention, U.S. Department of Health and Human Services* 2007; available from <http://www.cdc.gov/>; Internet; accessed 22 January 2007.

Chen, Longwen, Maria Stacewicz-Sapuntzakis, Claudine Duncan, Roohollah Sharifi, Luna Ghosh, Richard van Breemen, David Ashton, and Phyllis E. Bowen, “Oxidative DNA Damage in Prostate Cancer Patients Consuming Tomato Sauce-Based Entrees as a Whole-Food Intervention,” *Journal of the National Cancer Institute* 93, no. 24 (2001); available from <http://jnci.oxfordjournals.org/cgi/reprint/jnci;93/24/1872?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=tomatoes&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>; Internet; accessed 2 March 2007, 1872-1879.

“Cigarette Smoking Among Adults—2002,” *MMWR, Morbidity, Mortality Weekly Report*, comp. Centers for Disease Control 53, no. 20 (2004): 427-431.

“Clinical Challenges: Hand-foot syndrome,” eds. Nancy Jo Bush and Lisa Hartkopf Smith, *Oncology Nursing Forum* available from <http://www.ons.org/publications/journals/ONF/Volume28/Issue10/28101519.asp>; Internet; accessed 22 November 2006.

Curt, GA, G Katterhagen and F Mahaney, “Immunoaugmentative Therapy: A Primer on the Perils of Unproved Treatments,” *JAMA* 255 (1986):505-507.

Deroo, Bonnie J. and Kenneth S. Korach, "Estrogen Receptors and Human Disease," *The Journal of Clinical Investigation*, 116 No. 3 (2006): 561-570.

"Detailed Guide: Gastrointestinal Stromal Tumors, Do we know what causes gastro-intestinal stromal tumors?" *American Cancer Society*, 2007; available from http://www.cancer.org/docroot/CRI/content/CRI_2_4_2x_Do_We_Know_What_Causes_Gastrointestinal_Stromal_Tumors.asp?sitearea=; Internet; accessed 10 January 2007.

"Detailed Guide: Kidney Cancer, Do we know what causes kidney cancer (renal cell carcinoma)?" *American Cancer Society* 21 October 2005; available from http://www.cancer.org/docroot/CRI/content/CRI_2_4_2X_Do_we_know_what_cause_s_kidney_cancer_22.asp?sitearea=; Internet; accessed 22 February 2007.

"Dictionary of cancer terms," *National Cancer Institute* available from http://www.nci.nih.gov/Templates/db_alpha.aspx?CdrID=44825; Internet; accessed 23 November 2006.

"Doxil: Common Side Effects," *Ortho Biotech Products* 2006; available from http://www.doxil.com/learn_doxil/side_effect.jsp; Internet; accessed 22 November 2006.

"Elements of Cancer Genetics Risk Assessment and Counseling," *National Institutes of Health, U.S. Department of Health and Human Services* 18 January 2007; available from <http://www.cancer.gov/cancertopics/pdq/genetics/risk-assessment-and-counseling/healthprofessional>; Internet; accessed 10 February 2007.

"Environmental Health and Toxicology: Toxicology Glossary," *National Library of Medicine, National Institutes of Health* 28 November 2005; available from <http://sis.nlm.nih.gov/enviro/glossaryr.html>; Internet; accessed 26 February 2007.

"Environmental Risk Factors," *National Cancer Institute, U.S. National Institutes of Health* available from http://understandingrisk.cancer.gov/learn/factor_environmental.cfm; Internet; accessed 24 February 2007.

Evans, DGR, F Laloo, P Hopwood, A Maurice, A Baildam, A Brain, L Barr, and A Howell, "Surgical Decisions Made by 158 Women with Hereditary Breast Cancer Aged 50 Years," *EJSO, The Journal of Cancer Surgery* 31 (2005): 1112–1118.

"Fact Sheet: Asbestos Exposure Questions and Answers," *National Cancer Institute, U.S. National Institutes of Health*, 1 February 2004; available from <http://www.cancer.gov/cancertopics/factsheet/Risk/asbestos>; Internet; accessed 24 February 2007.

Fogel, Joshua, Steven M Albert, Freya Schnabel, Beth Ann Ditkoff, and Alfred I Neugut, "Internet Use and Social Support in Women with Breast Cancer," *Health Psychology* 21, no. 4 (2002):398–404.

"For The Patient : Renal Cell Carcinoma," *Hemispherx Biopharma, Inc.* available from http://www.hemispherx.net/content/ftp/renal_cell.htm; Internet; accessed 28 September 2006.

Fox, Maggie, "Reuter's Health Information: Cancer Deaths Finally on Decline in U.S.: Survey," *Medscape Today* 17 January 2007; available from <http://www.medscape.com/viewarticle/550925>; Internet; accessed 23 January 2007.

Fox, Susannah, "Online Health Search 2006," *Pew Internet & American Life Project* 29 October 2006; available from http://www.pewinternet.org/pdfs/PIP_Online_Health_2006.pdf; Internet; accessed 24 February 2007.

Friedman, Barbara, *Web Search Savvy: Strategies and Shortcuts for Online Research*, (Mahwah, NJ: Lawrence Erlbaum Associates, 2004).

Gandey, Allison, "Sudden Decline in Breast Cancer Could Be Linked to HRT," *Medscape Today* 14 December 2006; available from <http://www.medscape.com/viewarticle/549425>; Internet; accessed 26 February 2007.

Gelband H and others, "Immuno-Augmentative Therapy," In Gelband H and others. *Unconventional Cancer Treatments*. Washington, D.C.: U.S. Government Printing Office, (1990): available from <http://www.quackwatch.com/01QuackeryRelatedTopics/OTA/ota06.html>; Internet; accessed 10 February 2007.129-147.

"Gerson Therapy: Healing Your Body with the Gerson Therapy," *Gerson Institute* 2003; available from http://www.gerson.org/g_therapy/default.asp; Internet; accessed 19 February 2007

Ginsberg MM and others. Campylobacter Sepsis Associated with 'Nutritional Therapy,'" *MMWR* 30 (1981): 294-295.

Giovannucci, Edward, Eric B. Rimm, Yan Liu, Meir J. Stampfer, Walter C. Willett, "A Prospective Study of Tomato Products, Lycopene, and Prostate Cancer Risk," *Journal of the National Cancer Institute* 94, no. 5 (2002); available from <http://jnci.oxfordjournals.org/cgi/reprint/jnci;94/5/391?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=tomatoes&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>; Internet; accessed 10 March 2007, 391-398.

Green S. "A Critique of the Rationale for Cancer Treatment with Coffee Enemas and Diet," *JAMA* 268 (1992):3224-3227.

Green, S, "Immunoaugmentative Therapy. An Unproven Cancer Treatment," *JAMA*, 270 (1993): 1719-1921.

"Guide to Quitting Smoking," comp. American Cancer Society, *American Cancer Society* 27 October 2006; available from http://www.cancer.org/docroot/PED/content/PED_10_13X_Guide_for_Quitting_Smoking.asp#why; Internet; accessed 3 March 2007.

Harkness, Richard, "Tomato-Rich Diet Could Reduce Cancer Risk," *KnightRid-der/Tribune News Service* 9 March 2001; available from <http://www.highbeam.com/doc/1G1-71445739.html>; Internet; accessed 10 January 2007.

Hartmann, Lynn C, Thomas A Sellers, Daniel J Schaid, Thomas S Frank, Cheryl L Soderberg, Diana L Sitta, Marlene H Frost, Clive S Grant, John H Donohue, John E Woods and Shannon K McDonnell, "Efficacy of Bilateral Prophylactic Mastectomy in BRCA1 and BRCA2 Gene Mutation Carriers," *Journal of the National Cancer Institute* 93 (2001): 1633-1637.

"healthfinder: Your Guide to Reliable Health Information," *Office of Disease Prevention and Health Promotion, U.S. Department of Health and Human Services* 1997; available from <http://www.healthfinder.gov>; Internet; accessed 25 January 2007.

"Health Information," *National Institutes of Health, U.S. Department of Health and Human Services* 2007; available from <http://health.nih.gov>; Internet; accessed 22 January 2007.

"Health Through Nutrition and Self Care: The role of diet," *Kidney Cancer Association* available from <http://www.curekidneycancer.org/index.cfm?pageID=41>; Internet; accessed 22 November 2006.

Health, United States 2005: Chartbook on Trends in the Health of Americans, comp. Centers for Disease Control and Prevention, National Center for Health Statistics, U.S. Department of Health and Human Services (Hartsville, Md: Department of Health and Human Services, 2005), 33.

Health, United States 2006: Chartbook on Trends in the Health of Americans, comp. Centers for Disease Control and Prevention, National Center for Health Statistics, U.S. Department of Health and Human Services (Hartsville, Md: Department of Health and Human Services, 2005), 32.

Heieappell, Rudiger and R. Ackermann, "Rationale for Immunotherapy of Renal Cell Carcinoma," *Urological Research* 18 (1990): 357-372.

"How To Evaluate Health Information on the Internet: Questions and Answers," comp. National Cancer Institute, U.S. National Institutes of Health 1

September 2005; available from <http://www.cancer.gov/cancertopics/factsheet/Information/internet>; Internet; accessed 24 February 2007.

Ikemba, Catherine M, Claudia A Kozinetz, Timothy F Feltes, Charles D Fraser, Jr, E Dean McKenzie, Naeema Shah, and Antonio R Mott, "Internet Use in Families With Children Requiring Cardiac Surgery for Congenital Heart Disease," *Pediatrics* 109 (2002): 419-422.

Johnson, Brandon, "Advancing Understanding of Knowledge's Role in Lay Risk Perception," *Franklin Pierce Law Center* 1999; available from <http://www.piercelaw.edu/risk/vol4/summer/johnson.htm>; Internet; accessed 29 December 2006.

"JupiterResearch Finds That Rising Costs and Complexity in Healthcare Will Spur Consumer Demand For Online Health Media," *Business Wire* 3 October 2006, available from <http://www.businesswire.com>; Internet; accessed 17 February 2007.

Keller, Punam Anand, and Lauren Goldberg Block, "Increasing the Persuasive-ness of Fear Appeals: The Effect of Arousal and Elaboration," *The Journal of Consumer Research* 22, no. 4 (1996): 448-459.

Kiernan, Vincent, "Study Finds Errors in Medical Information Available on the Web," *Chronicle of Higher Education* 12 June 1998 [LexisNexis]; available from http://web.lexis-nexis.com.libproxy.lib.unc.edu/universe/document?_m=e4d2b33682fd0e374bedae2f53c608aa&_docnum=1&wchp=dGLbVtz-zSkVb&_md5=022907c735dc3c08073b2025e377d3d9; Internet; accessed 27 February 2007.

Kissman, Kris, and Ophelia A Torres, "Incarcerated Mothers Mutual Support Groups Aimed at Reducing Substance Abuse Relapse and Recidivism," *Contemporary Family Therapy* 26, no. 2 (June 2004): 217-228.

Kristen Neese, "FDA Approves New Treatment for Advanced Kidney Cancer." *FDA News* 20 December 2005; available from <http://www.fda.gov/bbs/topics/NEWS/2005/NEW01282.html>; Internet; accessed 28 September 2006.

Kush Sachdeva, "Renal Cell Carcinoma," 2006; available from <http://www.emedicine.com/med/byname/renal-cell-carcinoma.htm>; Internet; accessed 27 September 2006.

Lindberg, Donald AB, and Betsy L Humphreys, "Medicine and Health on the Internet: The Good, the Bad, and the Ugly," *JAMA* 280, no.15 (1998): 1303-1304.

Lynch, Henry T., Jane F. Lynch, and Wendy S. Rubinstein, "Prophylactic Mastectomy: Obstacles and Benefits," *J Natl Cancer Inst* 2001; 93: 1586-1587.

"Manage Your Health: Choosing Treatments," *ConsumerReportsMedical Guide.org*, *BMJ Publishing Group* 2003; available from

<http://www.consumerreports.org/mg/decision-support/choosing-treatments.htm>;
Internet; accessed 16 February 2007.

“Manage Your Health: How to Make the Best Decisions About Treatment,”
ConsumerReportsMedicalGuide.org, BMJ Publishing Group 2003; available from
<http://www.consumerreports.org/mg/decision-support/how-to-pick-the-best.htm>;
Internet; accessed 16 February 2007.

Marchione, Marilyn, “Study Says People at Risk for Colon Cancer Should
Curb Drinking, Take Folic Acid,” *Knight-Ridder/Tribune News Service* 13 March
2002; available from <http://www.highbeam.com/doc/1G1-92635688.html>; Internet;
accessed 10 January 2007.

Mathews J. “Media Feeds Frenzy Over Shark Cartilage as Cancer Treatment.”
Journal of the National Cancer Institute 85 (1993):1190-1191.

“MedlinePlus: Guide to Healthy Web Surfing,” comp. *U.S. National Library of
Medicine and the National Institutes of Health* 13 February 2006; available from
<http://www.nlm.nih.gov/medlineplus/healthywebsurfing.html>; Internet; accessed 24
February 2007.

“Medline Plus: Medical Encyclopedia-Renal cell carcinoma,” *National
Institutes of Health, Department of Health and Human Services* 21 December 2005;
available from <http://www.nlm.nih.gov/medlineplus/ency/article/000516.htm>; Internet;
accessed 19 January 2007.

Metcalf, Kelly A., and Steven A. Narod, “Breast Cancer Risk Perception
Among Women Who Have Undergone Prophylactic Bilateral Mastectomy,” *J Natl
Cancer Inst* 2002; 94: 1564-1568.

Michels, Karin B, Edward Giovannucci, Kaumudi J. Joshipura and Bernard A.
Rosner, Meir J. Stampfer, Charles S. Fuchs, Graham A. Colditz, Frank E. Speizer,
Walter C. Willett, “Prospective Study of Fruit and Vegetable Consumption and
Incidence of Colon and Rectal Cancers,” *Journal of the National Cancer Institute* 92,
no. 21 (2000): 1740-1752.

Miller, DR, and others, “Phase I/II Trial of the Safety and Efficacy of Shark
Cartilage in the Treatment of Advanced Cancer,” *Journal of Clinical Oncology* 16,
no.11 (1998): available from http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=9817287&dopt=Abstract; Internet; accessed 10
February 2007, 3649-3655.

“Miscellaneous Agents,” in *Goodman & Gilman’s: The Pharmacological Basis
of Therapeutics, 11th ed.*, eds. Laurence L. Brunton, John S Lazo, and Keith L.
Parker, (New York: McGraw-Hill,2006).

Neergaard, Lauran, "Obesity Linked to Multiple Cancer Risks," *The Boston Globe / the Associated Press* 24 August 2004; available from http://www.boston.com/news/nation/articles/2004/08/24/obesity_linked_to_multiple_cancer_risks; Internet; accessed 10 January 2007.

"Next Steps After Your Diagnosis: Finding Information and Support," *Agency for Healthcare Research and Quality, U.S. Department of Health & Human Services* available from <http://www.ahrq.gov/consumer/diaginf5.htm>; Internet; accessed 16 August 2006.

"NEXAVAR (sorafenib) tablets 200 mg," *Bayer Pharmaceuticals Corporation* 2006; available from http://www.nexavar.com/wt/page/hp_moa; Internet; accessed 26 September 2006.

"Operation Cure.all Nets Shark Cartilage Promoters: Two Companies Charged with Making False and Unsubstantiated Claims for Their Shark Cartilage and Skin Cream as Cancer Treatments," FTC news release, *Quackwatch* 29 June 2000; available from <http://www.quackwatch.com/02ConsumerProtection/FTCActions/lane.html>; Internet; accessed 10 February 2007.

Orleans, Carole Tracy, "Preventing Tobacco-Caused Cancer: A Call to Action," *Environmental Health Perspectives* 103, suppl. 8 (1995): 149-152.

Owen, Jason E, Janine Giese-Davis, Matt Cordova, Carol Kronenwetter, Mitch Golant, and David Spiegel, "Self-Report and Linguistic Indicators of Emotional Expression in Narratives as Predictors of Adjustment to Cancer," *Journal of Behavioral Medicine* 29, no.4 (2006): 335-345.

Park, Michael Y, "E. Coli Outbreak Hurts Spinach Farming Industry, Restaurants," *FOXNews.com* 22 September 2006; available from <http://www.foxnews.com/story/0,2933,215257,00.html>; Internet; accessed 31 January 2007.

Patient Inform, "Home," available from <http://www.patientinform.com/home-blog/>; Internet; accessed 15 April 2007.

"Personalised Risk Communication for Informed Decision Making about Taking Screening Tests," In *Cochran Review Abstracts* 2006: available from <http://www.medscape.com/viewarticle/485866>; Internet; accessed 10 January 2007.

"Prevention & Early Detection: Food and Fitness," *American Cancer Society* 2007; available from http://www.cancer.org/docroot/PED/ped_3.asp?sitearea=PED; Internet; accessed 10 January 2007.

"Prevention & Early Detection: Tobacco and Cancer, Tobacco-Related Cancers Fact Sheet," *American Cancer Society* 2007; available from <http://www.cancer>

.org/docroot/PED/content/PED_10_2x_Tobacco-Related_Cancers_Fact_Sheet.asp?sitearea=PED; Internet; accessed 31 January 2007.

Prochaska, James O, John C Norcross, and Carlo C DiClemente, *Changing for Good* (New York: Quill, 2002).

"PROLEUKIN® IL-2 Therapy: Metastatic Kidney Cancer," *Chiron Corporation* 2006; available from http://proleukin.com/metastatic_kidney_cancer/intro.aspx; Internet; accessed 28 September 2006.

"Proven clinical benefit in advanced renal cell carcinoma," *Onyx Pharmaceuticals* 2007; available from http://www.nexavar.com/wt/page/patient_nexavar; Internet; accessed 24 October 2006.

Rappaport, Julian, "Community Narratives: Tales of Terror and Joy," *American Journal of Community Psychology* 28, no. 1 (2000).

"Renal Cell Cancer: Treatment General Information," *National Cancer Institute, U.S. National Institutes of Health* 2007; available from <http://www.cancer.gov/cancerinfo/pdq/treatment/renalcell/healthprofessional/>; Internet; accessed 10 January 2007.

Rohrmann, Karl, Michael Staehler, Nikolas Haseke, Alexander Bachmann, Christian G. Stief and Michael Siebels, "Immunotherapy in Metastatic Renal Cell Carcinoma," *World J Urol* 23 (2005): 196–201.

Shelton, James D, "The Provider Perspective: Human after All," *International Family Planning Perspectives* 27, no. 3 (2001).

Shiv, Baba, Julie A Edell, and John W Payne, "Factors Affecting the Impact of Negatively and Positively Framed Ad Messages," *The Journal of Consumer Research* 24, no. 3 (1997): 285-294.

Shopland, Donald R, "Tobacco Use and Its Contribution to Early Cancer Mortality with a Special Emphasis on Cigarette Smoking," *Environmental Health Perspectives* 103, suppl. 8 (1995): 131-142.

"Single-Day Famvir," *Novartis Pharmaceutical Corporation* 2007; available from http://www.famvir.com/index.jsp?usertrack.filter_applied=true&Novald=2229644967847995331; Internet; accessed 20 January 2007.

Singer, Eleanor, and Phyllis M Endreny, *Reporting on Risk: How the Mass Media Portray Accidents, Diseases, Disasters, and Other Hazards* (New York: Russell Sage Foundation, 1993).

"Skin Reactions and Cancer Therapy," *Bayer Pharmaceuticals Corporation* 20 December 2005; available from http://www.onyx-pharm.com/wt/page/pr_1135103068; Internet; accessed 22 November 2006.

"Solitary Kidney," comp. National Kidney and Urologic Diseases Information Clearinghouse, *Kidney and Urologic Home* October 2006; available from <http://kidney.niddk.nih.gov/kudiseases/pubs/solitarykidney/>; Internet; accessed 13 March 2007.

Spitzer, Alan R, "The Internet—A New Medical Problem or Invaluable Ally?" *Pediatrics* 114 (2004): 817-819.

Steinkellner, Hans, Sylvie Rabot, Christian Freywald, Eva Nobis, Gerlinde Scharf, Monika Chabicovsky, Siegfried Knasmüller and Fekadu Kassie, "Effects of Cruciferous Vegetables and Their Constituents on Drug Metabolizing Enzymes Involved in the Bioactivation of DNA-reactive Dietary Carcinogens," *Mutation Research* 480–481 (2001): 285–297.

Stobbe, Mike, "For Second Year, US Cancer Deaths Drop: Success Cited in Treatment and Detection," *The Associated Press/The Boston Globe* 18 January 2007; available from http://www.boston.com/news/nation/articles/2007/01/18/for_2d_year_us_cancer_deaths_drop/?rss_id=Boston+Globe++National+News; Internet; 22 February 2007.

Strecher, Victor J, and Irwin M Rosenstock, "The Health Belief Model," in *Health Behavior and Health Education* eds. Karen Glanz, Francis Marcus Lewis, and Barbara K Rimer (San Francisco: Jossey-Bass: A Wiley Company, 1997), 41-59.

"Therapies for Advanced Kidney Cancer," *Kidney Cancer Association* 11 February 2007; available from <http://kidneycancer.org/index.cfm?pageID=40>; Internet; accessed 23 February 2007.

"Tobacco Use Among Adults—United States, 2005," *MMWR, Morbidity, Mortality Weekly Report*, comp. Centers for Disease Control 55, no. 42 (2006): 1145-1148.

Trauth, Jeannette M, "A Case Study of Health Risk Communication: What the Public Wants and What it Gets," available from <http://www.piercelaw.edu/risk/vol5/winter/trauth.htm>; Internet; accessed 29 December 2006.

Trepanier, Angela, Mary Ahrens, and Wendy McKinnon, "Genetic Cancer Risk Assessment and Counseling: Recommendations of the National Society of Genetic Counselors," *Journal of Genetic Counseling Vol. 13, No. 2, 2004.*

"Understanding Kidney Cancer," *Kidney Cancer Association* 14 January 2007; available from <http://www.kidneycancer.org/index.cfm?pageID=213>; Internet; accessed 10 January 2007.

"Understanding Cancer Series: Cancer, What is cancer?" *National Cancer Institute, U.S. National Institutes of Health*, 2004; available from <http://www.cancer.gov/cancertopics/understandingcancer/cancer/Slide1>; Internet; accessed 10 January 2007.

"Understanding Cancer Series: Gene Testing, Slides: 6 - 10, 12, 18, 19, 20 and 25," *National Cancer Institute, U.S. National Institutes of Health* 28 January 2005; available from <http://www.cancer.gov/cancertopics/understandingcancer/genetesting/Slide25>; Internet; accessed 24 February 2007.

Wang, Linda, and Katherine Arnold, "Whole Tomato Powder Effective in Preventing Prostate Cancer," *Journal of the National Cancer Institute* 95, no. 21 (2003); available from <http://jnci.oxfordjournals.org/cgi/content/full/95/21/1561?maxtoshow=&HITS=10&hits=10&RESULTFORMAT=&fulltext=tomatoes&searchid=1&FIRSTINDEX=0&resourcetype=HWCIT>; Internet; accessed 10 March 2007, 1561.

"Watchdog Warns Over Apricot Seeds," *BBC News* 11 April 2006; available from <http://news.bbc.co.uk/2/hi/health/4901132.stm>; Internet; accessed 22 November 2006.

"What You Need to Know About Kidney Cancer: Symptoms," *National Cancer Institute, U.S. National Institutes of Health* 2004; available from <http://www.cancer.gov/cancertopics/wyntk/kidney/page5>; Internet; accessed 10 January 2007.

"What You Need to Know About Kidney Cancer: Understanding Cancer," *National Cancer Institute, U.S. National Institutes of Health*, 30 March 2004; available from <http://www.cancer.gov/cancertopics/wyntk/kidney/page3>; Internet; accessed 24 February 2007.

Wood, Julie "FDA approves Nexavar for treatment of patients with advanced kidney cancer," 20 December 2005; available from http://www.onyx-pharm.com/wt/page/pr_1135103068; Internet; accessed 29 September 2006.

Zawisza, Julie, and Susan Bro, "FDA Announces Findings from Investigation of Foodborne *E. coli* O157:H7 Outbreak in Spinach," *FDA*, 29 September 2006; available from <http://www.fda.gov/bbs/topics/NEWS/2006/NEW01474.html>; Internet; accessed 31 January 2007.

INTERVIEWS

Adriance, Robin, face-to-face interview by Waynette Morley, tape recording, 13 November 2006, Hendersonville, N.C.

Demshur, Sally, face-to-face interview by Waynette Morley, tape recording, 20 March and 12 April 2007, MicroMass Communications, Cary, N.C.

Edge, Harvey Zemp, and Tina Edge, face-to-face interview by Waynette Morley, tape recording, 21 February 2007, Laurinburg, N.C.

Fesko, Yuri, oncologist at Duke Hematology and Oncology, Duke Raleigh Hospital, Raleigh, N.C., phone interview by Waynette Morley, tape recording, 20 March and 18 April 2007, at MicroMass Communications, Cary, N.C.

Gansler, Ted, M.D., M.B.A., director of medical content, American Cancer Society, phone interview by Waynette Morley, tape recording, 13 April 2007, at MicroMass Communications, Cary, N.C.

Hartt Minor, Becky, M.A., face-to-face interview by Waynette Morley, tape recording, 22 March 2007, Duke Comprehensive Cancer Center, Durham, N.C.

Ingber, Donald E., M.D., Ph.D., Judah Folkman Professor of Vascular Biology, Department of Pathology, Harvard Medical School, Vascular Biology Program, Children's Hospital, Karp Family Research Laboratories, Boston, Mass., phone interview by Waynette Morley, tape recording, 29 March 2007, at MicroMass Communications, Cary, N.C.

Jacobs, Jimmy, and Reba Jacobs, phone and face-to-face interviews by Waynette Morley, tape recording, 15 November 2006 – 10 March 2007, Laurinburg, N.C.

Willard, Ellen, oncologist at Pinehurst Medical Center, Pinehurst, N.C., e-mail interview by Waynette Morley, 5 March 2007, Laurinburg, N.C.