

# Breast Cancer Prevention

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## Introduction

Most women don't know what their true risk of breast cancer is. As many women underestimate it as overestimate it.

Linda McCartney, a long-time vegetarian, recently died of breast cancer.

National news magazines cover stories touted "miracle drugs" that cure cancer. Patient's hopes were dashed when they read that these only worked in mice.

Studies showing that tamoxifen and raloxifene reduce breast cancer by almost 50% were released in May. Wary patients focus on the side effects.

This paper is designed to separate the hype from the real hope and distinguish fears from facts. It presents complex information in a form that the average person can understand and apply to herself. It is divided into six sections. In part I the meaning of "risk," "relative risk," and "absolute risk" are described in plain English. The risk of breast cancer is put into perspective with other health risks. Part II describes the various risk factors for developing breast cancer and describes their relative importance in an individual. There is a personal risk assessment form to determine whether you have a low or high risk of breast cancer. Part III is an analysis of the two breast cancer prevention trials, data presented to the public for the first time May 18, 1998. Tables show both the desirable and undesirable effects. Part IV is a comparison of the benefits and risks of taking either nothing (placebo or control), estrogen (hormone replacement), tamoxifen or raloxifene. Part V describes how lifestyle changes can reduce the risk of breast cancer by as much as 50%. In Part VI a balanced approach considering both lifestyle change and medication is presented that honors women's own value systems and decision making process.

## Part I

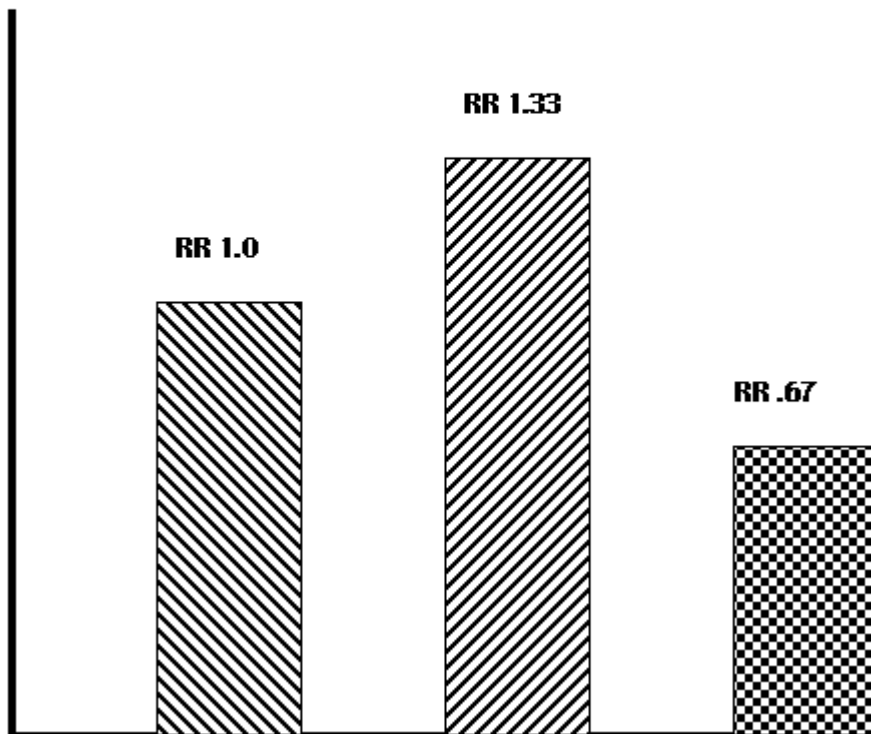
Mark Twain once said, "There are lies. There are damned lies. And then there are statistics." Without a strong background in math it is often difficult to understand statistics. It becomes even more complex when different studies give different results. Because there is no single right answer, in this paper a range of results is given rather than a single number.

Many studies report their findings in terms of "Relative Risk" (RR). See Fig. 1. It is important to know what the baseline is, i.e., "relative to what." The risk of breast cancer is affected by age at first full term pregnancy. The lowest risk is for women who have their first child at about 15 years old. If that is used as baseline and assigned a risk of "1.0," then having a child at age 30 has a relative risk of 3. Conversely, taking a baseline of age 30 as a risk of 1.0, having a child at 15 would have a risk of 0.3. However, getting pregnant at 15 to cut your risk by 2/3 is hardly a reasonable suggestion for cancer prevention!

The fact that tamoxifen “doubles the risk of uterine cancer and halves the risk of breast cancer” is true but misleading. The relative risk of breast cancer and uterine cancer is affected (in opposite directions) by the same amount, a factor of 2 or conversely 1/2. Psychologically, however, it seems more impressive to talk of doubling the risk of a cancer than halving it.

Fig. 1

## GRAPH OF RELATIVE RISK



A more useful way of considering risk is to look at it in absolute terms (how many women out of 1000 would be affected) and put it in the context of other information. To understand the true impact of tamoxifen one must know that also that breast cancer is 100 times more common than uterine cancer (100/1000 women vs. 1/1000). Thus, tamoxifen causes 1 case of uterine cancer in 1000 women and prevents 50 cases of breast cancer in that same 1000 women.

Because of the focus on cancer, the relative risks of other health events may be overlooked. In fact, a woman’s risk of heart disease is almost 5 times as great as for breast cancer (1 in 2 vs. 1 in 9.) Her risk of dying from heart disease is 9.7 times greater than from breast cancer. Other events, like auto accidents, skull fractures, even injuring oneself on a chair or in bed, are more common than getting breast cancer. (See Fig. 2.)

**Fig. 2**

## **Putting Risk in Perspective**

Research has shown that over half of women either overestimate or underestimate their risk of breast cancer. Because breast cancer is so often in the media women tend to believe that it is much more common than other health diseases. The following table shows the risks of other diseases and events in comparison with that of breast cancer. (Taken from The Book of Risks by Larry Laudan.)

### **Annual risk (chance of event during 1 year)**

Auto accident	1 in 12
Heart attack (if over 35yo)	1 in 77
Fractured skull	1 in 100
60 yo woman developing breast cancer	1 in 250
Dying of heart disease	1 in 340
Injuring self on a chair or bed	1 in 400
Attempting suicide	1 in 600
40 yo woman developing breast cancer	1 in 1000
Man developing prostate cancer	1 in 1000
60 yo woman dying of breast cancer	1 in 1000
Dying from a stroke	1 in 1700
Dying in accident	1 in 2900
40 yo woman dying of breast cancer	1 in 5000

### **Lifetime Risk (chance of event from birth to death)**

Woman's risk of heart disease	1 in 2
Average person's risk of dying from heart disease	1 in 3
Average person's risk of dying from cancer	1 in 5
Average person's risk of mental illness	1 in 5
Woman's risk of breast cancer	1 in 9
Woman's risk of lung cancer	1 in 12
Average person's risk of injury	1 in 13
Average person's risk of stroke	1 in 14
Woman's risk of dying from breast cancer	1 in 30
Average person's risk of dying from auto accident	1 in 45
Average person's risk of suicide	1 in 72

Relative risk of dying from heart disease compared to breast cancer 9.7

Relative risk of dying from accidents compared to breast cancer 1.36

## Part II

The biggest risk for breast cancer is birthdays; i.e., age. (See Figures 3 (next page) and 4.) This is much more important than having a first degree relative (mother or sister) with breast cancer, or hormone use, or any other factor except certain specific precancerous lesions on breast biopsy and certain specific genes that can be measured (BRCA 1 or 2).

Fig. 4

### Risk of Breast Cancer

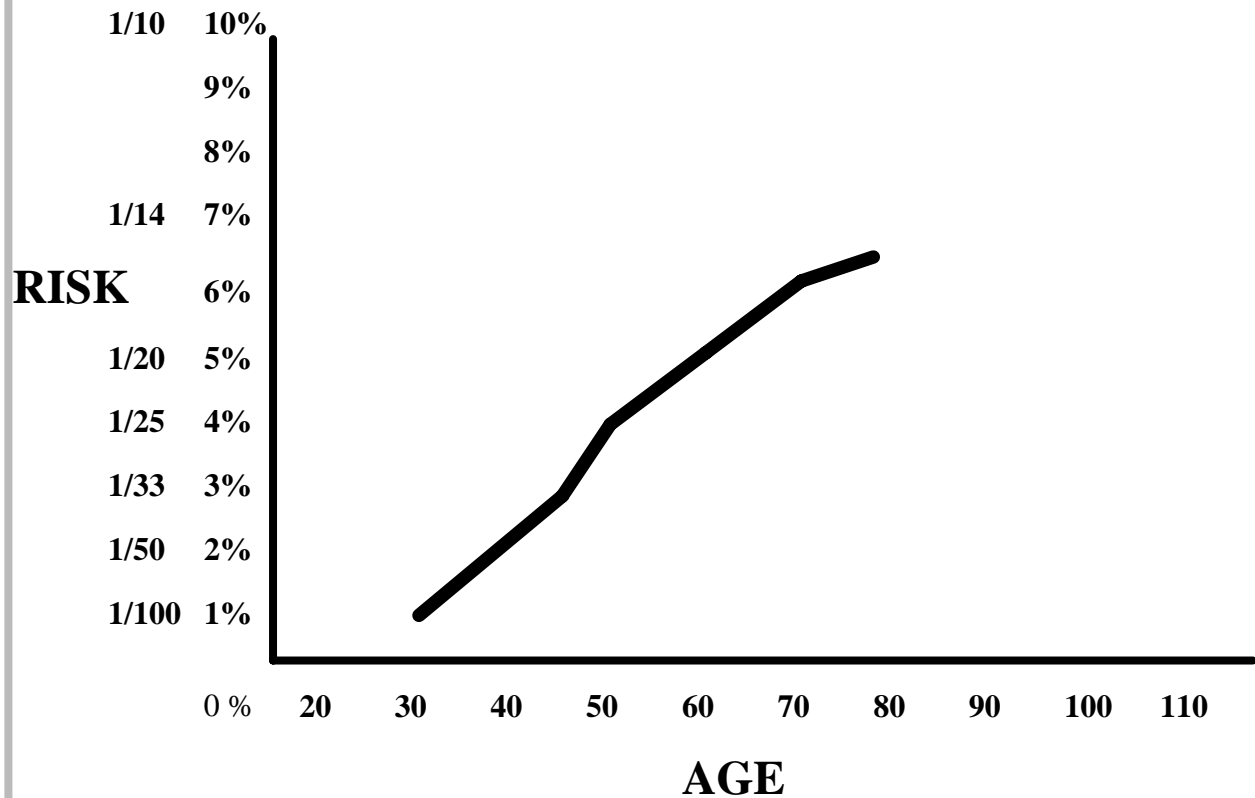
<b>Age range</b>	<b>Risk of Breast cancer over 10 years*</b>
<b>age 20-40</b>	<b>0.5%</b>
<b>age 35-55</b>	<b>2.5%</b>
<b>age 40-59</b>	<b>4.0%</b>
<b>age 50-70</b>	<b>4.7%</b>
<b>age 65-85</b>	<b>5.5%</b>
<b>age 65-110</b>	<b>6.5%</b>
<b>birth to 110**</b>	<b>10-12%</b>

**\* Risk per year is 1/10th of this number**

**\*\*Note: the 1 of 8 statistic (12.5%) refers to the  
LIFETIME risk of women living to age 110**

Fig 3

## RISK OF BREAST CANCER WITH AGE



To read this table, find your age and then go up to the curve to determine the average risk of breast cancer in the next 10 years. For example, for a 50 year old, the risk is approximately 4% from ages 50 to 59 or 1 out of 25 for that decade. The risk while 50 years old is 1/10 of that or 1/250. The risk while 51 years old is also 1/250, etc.

The common “fact” that women quote is that the risk of breast cancer is 1 in 8 or 1 in 10 (about 10-12%). That is true if one lives to 110 and doesn’t die of a heart attack or stroke before that. Figure 4 is a table of the risks of breast cancer at various ages. A woman in her 40’s has a chance of breast cancer in the next 10 years of about 2-2.5% (1/50 to 1/40), **not** 1 in 8. Between 50 and 59 the chances increase to about 4% (1/25), but still not to 1 in 8.

A 50 year old woman does not have a 1 in 25 chance of getting breast cancer each day, or each week, or even each year. Over TEN years there is a 4% chance of getting cancer. Each year, on the average, she has a 0.4% (1/250) chance of cancer. The gruesome statistic that “1 out of 8 women get breast cancer” is a crude oversimplification of the facts.

There are many factors which increase or decrease a woman’s risk of breast cancer. When such things as age at first menstrual period, age at first live birth, number of breast biopsies, or even the number of alcoholic drinks per day are studied, their impact on the chances of developing cancer is reported as “relative risk (RR).” As mentioned above, “relative to what?” is an important question to ask. The better controlled studies match groups for important variables, but are not always able to isolate just one factor as the cause of the difference.

Statistically, the number of benign breast biopsies a woman undergoes is associated with a higher risk of breast cancer. However, the women who have truly benign biopsies may not have a higher risk, they may simply be more concerned and have more access to medical care. It is the biopsies that show “atypical hyperplasia” or “lobular carcinoma in situ” that carry most of the increased risk.

Figure 5 shows various factors that have been associated with the risk of breast cancer. They are grouped according to magnitude of risk as “small,” “medium,” and “significant.” Statisticians generally feel that relative risks below 1.5 are small and those much above 2 are significant.

Fig. 5

### Risk Factors for Breast Cancer

	Small	Medium	Significant
<b>Hormone/Endocrine</b>			
Age at menarche	<12 yo	Age menopause >55	first child at age >35
first child at age	25-30	first child 30-35	Nulliparous
Estrogen HRT	> 5 yr		
<b>Family History*</b>			
	1 side, <u>post</u> menopause		1 side, <u>pre</u> menopausal both sides, either pre- or postmenopausal
<b>Biopsies</b>			
	fibroadenoma	breast biopsy, proliferative	biopsy with atypia biopsy with LCIS Prior breast cancer
<b>Lifestyle</b>			
	Sedentary 1-2 alcoholic drinks/d	(Exercise 4d/wk)** 2-5 alcoholic drinks/d Obesity***	(Exercise 6d/wk)

\* Positive family history of either mother or sister with breast cancer in one breast. If a relative had bilateral breast cancer, the risk is significant even if it developed after menopause. However, even if both mother and sister have had bilateral breast cancer, lifetime risk is estimated at no more than 25-30%. If you have a defined gene for breast cancer such as BRCA 1 gene the risk before age 50 is 50%, and by age 65 is 80%. There is a difference between familial breast cancer (the former example) and hereditary breast cancer (presence of BRCA gene).

\*\*More exercise reduces risk of breast cancer

\*\*\* Complex data suggest that the risk is increased only for post menopausal women and related to weight gain after age 25.

At this point fill out the **Personal Risk Assessment**. Note that the larger risks are generally not under one's control (family history, late age of having children). Others like alcohol consumption, exercise, diet, and weight, which are matters of lifestyle, are modifiable. Recognize also that the mathematics of computing relative risk is not like balancing a checkbook or doing multiplication tables. If one has a relative risk of 1.5 for one factor and 2.0 for another factor, they are not added to get a risk of 3.5 ( $1.5 + 2.0$ ) nor multiplied for a risk of 3.0 ( $1.5 \times 2.0$ ). There are complex computer programs that calculate risk, but most of the time tables are used which consider the most important factors.

In general a woman with some combination of the following factors would be considered to have a sufficient risk of breast cancer to consider using medication. A decision about medication would also consider other risks such as heart disease and osteoporosis.

Age 60 or older *or*;

Diagnosis of lobular carcinoma in situ on breast biopsy at any age *or*;

Age 35, two or more 1st degree relatives with breast cancer, *and* benign breast biopsy *or*,

Age 45, one or more 1st degree relatives with breast cancer, *and* benign breast biopsy *or*,

Age 55, one or more 1st degree relatives with breast cancer *or* benign breast biopsy.

### Part III

In May, 1998, preliminary data on the tamoxifen and raloxifene breast cancer prevention trials were released. These medications are often described as "anti-estrogens" although their action is more complex than that. More accurately they are called "Selective Estrogen Receptor Modulators (SERM's)." In cells that have estrogen receptors (breast, bone, liver, uterus) they act on the DNA in the nucleus to either turn on or turn off certain cell functions. They are closely related chemically though they have slightly different structures. Raloxifene has little affect upon the uterus while tamoxifen stimulates it slightly.

These studies examined different populations of women and were done for slightly different purposes. Tamoxifen is known to prevent a new breast cancer from developing in women who are treated with it as adjuvant therapy for a known cancer. The study was designed to treat women who were at risk for but had never developed cancer. The focus was on the balance between good (breast cancer prevention) effects and side effects. The raloxifene trial was on women with osteoporosis (post-menopausal) and was looking more at other possible benefits.

### Tamoxifen Breast Cancer Prevention Trial

This study included 13,388 women, ages 35 and older. To be eligible a woman needed a risk of breast cancer equal to a average 60 year old, about 5% in 10 yrs. Factors considered in determining risk included age, number of first degree relatives with breast cancer, number of prior breast biopsies, atypical hyperplasia or LCIS on biopsy, age at menarche, and age at first live birth. Half the women received 20 mg Tamoxifen for average 3.6 yrs, half got placebo. Forty percent of women were between ages 35-49; 30% were 50-59; 30% were 60 or older.

### Fig. 6 RESULTS OF TAMOXIFEN TRIAL

	Placebo 6707 subj.	Tamoxifen 6801 subj.	Comments
Breast Cancer	154	85	45% less
Non invasive Breast Ca	59	31	48% less
Fractures	71	47	34% less
Endometrial Cancer	14	33	135% more*
Vascular Events	70	99	41% more#

\*In Tamoxifen group, all cancers were stage 1, no deaths; In control group 1 death.

#Vascular events: no difference in fatal strokes or fatal MI; 2 fatal pulmonary embolus in tamoxifen group. More blood clots in legs with tamoxifen group, RR 1.6

Tamoxifen cut the risk of both invasive and non-invasive (ductal carcinoma in situ) breast cancers in half. For a 60 year old woman facing a risk of 5% over 10 years, this would reduce it to 2.5%, or the risk of a woman 15-20 years younger. For a 45 year old woman whose mother had post menopausal breast cancer this would balance or neutralize the increased risk.

There was a greater danger of endometrial (uterus) cancer. More than twice as many women on tamoxifen got uterine cancer than on placebo, raising the incidence from 1/1000 to approximately 2/1000. Because women taking tamoxifen were carefully watched, all these cancers were discovered while stage 1 and cured with simple hysterectomy. The only woman to die of uterine cancer was in the control group.

Venous blood clots were more common with tamoxifen by a factor of 2. In the general population the incidence of blood clots increases with age. For women not taking hormones the incidence of either thrombophlebitis or pulmonary embolus is .5-1/1000 ages 50-59, 1.5-3.5/1000 ages 60-69, and 3.5-6/1000 ages 70-79. Hence, with tamoxifen, venous blood clots occur in 2/1000 to 10/1000 women depending upon age. Both conditions are treated with anticoagulants. Thrombophlebitis, while uncomfortable, is life threatening only if the blood clot leaves the legs and goes to the lungs (pulmonary embolus). In this study, 2 women taking tamoxifen died of pulmonary emboli. Women with a history of blood clots should be cautious about taking tamoxifen.

Arterial blood clots (strokes, TIA's, heart attacks) were the same in both control and tamoxifen groups.

Other studies of tamoxifen compared with placebo showed significant increases in hot flashes and vaginal discharge but no differences in bone pain, joint pain, indigestion, nausea, vomiting, headache, insomnia, irritability, depression, or fatigue. In another study there was no difference between placebo and Tamoxifen in the quality of life or activity level. The control group, not the Tamoxifen group, reported feeling less feminine and having less sexual desire.

### **Raloxifene Prevention Trials**

The following data are from a series of studies, with varying numbers of subjects and varying follow up times. In general the studies have been 2 to 3 years long. They were limited to older women, generally with a diagnosis of osteoporosis. Raloxifene is a relatively new drug. The following results will need to be confirmed in other studies.

**Fig. 7**

<b>Results of Raloxifene Trial</b>			
	Placebo 2560 subj.	Raloxifene 5140 subj.	Comments
Breast Cancer	21 (.81%)	11 (.21%)	74% less*
Vascular events	1.43/1000	3.08/1000	RR = 2.2**
Endometrial Cancer			RR .38***

\*This is an early study. The group, mainly women over age 60, would be expected to have more benefit than the younger group in the tamoxifen trial. It is premature to conclude that raloxifene is better than tamoxifen in preventing breast cancer.

\*\*Like tamoxifen, there is a higher incidence of blood clots.

\*\*\*Though less than control, the result is not statistically significantly different. There is, however, not expected to be an increased risk of uterine cancer.

## **Part IV**

Gilda Radner, the comedienne from Saturday Night Live, who died of hereditary ovarian cancer, wrote a book titled, "It's Always Something." In spite of a search for a risk free life, certain events occur. Linda McCartney's impeccable lifestyle did not prevent her breast cancer.

There is a benefit and a risk to almost every action. There is also a risk of not acting and "letting nature take its course." A deer caught in the headlights of an oncoming car must overcome its fear and jump to one side to avoid being hit.

Figure 8 is compiled from various sources and is a comparison of the effects of placebo, estrogen, tamoxifen and raloxifene. In order to make the comparisons between drugs simpler I have had to assume that the control groups are similar, which is not always exact. The relative risks should be considered approximate.

**Fig. 8**

**Comparison of Risks and Benefits**

	<b>Control/Placebo</b>	<b>HRT/Est.</b>	<b>Tamoxifen</b>	<b>Raloxifene</b>
<b>Cancer</b>				
Breast Cancer	varies with age	+0-30% <sup>1</sup>	- 45%	-75% (est.) <sup>2</sup>
age 40-70	25/1000	35/1000	13/1000	
Uterine Cancer <sup>3</sup>	1/1000	2-3/1000	2/1000	<1/1000
<b>Vascular Disease</b>				
Heart Disease <sup>4</sup>	1/2 lifetime risk	-35-50%	-33-63% MI	
Cholesterol		no change	-8-15%	-6-11%
LDL (bad guy)		-4%	-16-26%	-10-20%
HDL (good guy)		+10%	no change	no change
Venous Blood Clots <sup>5</sup>	1-5/1000	5-10/1000	5-10/1000	5-10/1000
<b>Osteoporosis<sup>6</sup></b>				
Bone Density spine	-1-2%/yr	+5.2%	+4-2.4%	+1-3%
Bone Density hip	-1-2%/yr	+3.3%	+6%	+1-3%
Fractures		-25-50%	-35%	
<b>Side effects</b>				
Weight gain	1.1 kg		1.3kg	
Hot flashes	23%	0-5%		26%
	43%		56%	
Breast pain	2-5%	30-38%		3-4%
Breast enlargement		4%		1%
Vaginal discharge	11%		22%	
Ocular problems			not sig.	not sig.
+ increase, - decrease				

**Footnotes**

1 There is considerable controversy whether hormone replacement increases the risk of breast cancer. Most of the data showing an increased risk comes from Europe where doses of estrogen are 2 times what are used in the US (Premarin .625mg or Estrace 1mg). If there is an increased risk, it probably applies only to women with a strong family history of breast cancer.

2 Because the data on Raloxifene are limited further studies are likely to show the effect closer to that of Tamoxifen.

3 Does not apply to women with hysterectomy. Hormone replacement therapy should include progesterone if the uterus is intact. The increased risk with Tamoxifen only applied to post menopausal women.

4 Estrogen reduces the risk of heart attack and heart disease by about 50% by improving the ratio of total cholesterol to HDL. Studies using Tamoxifen for adjuvant therapy for breast cancer showed a decrease of 33-63% in fatal heart attacks but were not controlled for heart disease risk factors. Most authorities feel Tamoxifen will be almost as good as estrogen and that Raloxifene will be about the same as Tamoxifen in this regard.

5 The chances of venous blood clots (thrombophlebitis and pulmonary emboli) increase with age. The rate varies from 1/1000 for women age 50-60 to 3-6/1000 ages 70-80. Estrogen, Tamoxifen and Raloxifene all increase the chances of blood clots by about 2 or up to 1/100 women.

6 Osteoporosis occurs mainly after menopause when bone density decreases approximately 1-2%/year. Risk factors for osteoporosis include a positive family history, low calcium intake, sedentary life style, and smoking. Osteoporotic hip fractures cause 65,000 deaths/year compared with 43,000/year from breast cancer (RR 1.5). Estrogen is the standard treatment for osteoporosis. Alendronate (Fosmax) increases bone density comparably to premarin, 3.3% at the hip and 5.8% in the lumbar spine.

## Part V

Diet and exercise have long been known to influence the risk of cancer. Epidemiologic and experimental studies have shown that the chances of breast cancer are directly proportional to animal fat intake. Populations with low fat diets (e.g., Japan) have 1/4 to 1/10 the incidence of breast cancer as in the US. When these populations increase their fat intake (e.g., Japanese in Hawaii), the incidence increases to that of Caucasians. Experimental studies show that it is necessary to reduce dietary fat significantly, to 15% of total calories, to get a measurable effect. Less strict dietary restriction (e.g., to 20%) may not be as effective.

It is believed that a decreased total fat intake could slow breast development by restricting the caloric energy needed for tumor growth, decreasing the levels of circulating sex hormones, removing or reducing the levels of certain potentially tumor stimulating fatty acids and by reducing exposure to lipid-soluble carcinogens that may be present in animal fat.

In January, 1998, a group of doctors gathered at the Commonwealth Conference on New Directions in Cancer Care and developed a consensus statement about dietary prevention of breast cancer. Their recommendations were for a diet of no more than 15% of calories from fat. The majority of the fat should come from omega-3 fats (from fish and/or fish oil) and omega-9 fats (from olive oil). Monounsaturated fats should take precedence over polyunsaturated and saturated fats within the 15% goal. As a rough estimate, for a woman 5'6" tall, age above 50, a 15% fat diet would be 30 grams of fat. For women younger than 50, 33 grams would be allowed.

There should be 10-12 servings daily of whole vegetables and fruits. This provides approximately 20-24 grams of fiber along with many potentially helpful cancer-protective chemicals. There should also be 4-6 servings of whole grains (or one serving of a high fiber cereal as an alternative) daily. A serving of vegetables, fruit or pasta is approximately the size of a tennis ball (6 oz).

The data showing exercise reduces cancer is even more compelling. Studies consistently show that people who exercise regularly have less cancer than those with sedentary lifestyles. The more exercise, the greater the reduction in cancer risk. The mechanism by which exercise reduces breast cancer is not established but is felt to involve changes in body fat and fat metabolism.

Fig. 9

### LIFESTYLE PREVENTION OF BREAST CANCER: EXERCISE\*

4 hr/wk walking	RR .76-.98
4 hr/wk aerobics	RR .67
Competitive sports	RR .48

\*Four exercise levels for women in Finland were determined based upon the amount of activity at work and in leisure time. 1) Sedentary: leisure-TV, work-desk, RR 1.0; 2) Moderate: leisure- 4hr/wk walking, bike etc., work-walking RR .76-.98; 3) Regular exercise: leisure 4hr fitness exercise, work-lifting, walking RR .67; 4) Heavy exercise: leisure-competitive sports, work-manual labor, RR.48. The strongest effects for premenopausal women, for those who were overweight when they started exercise, and for those who continued to exercise.

## Part VI

Albert Einstein once said, “You should always make things as simple as possible....but no simpler.” Developing a strategy to prevent breast cancer is not always simple. There are many issues to consider. At minimum, everyone should evaluate their lifestyle with respect to diet, exercise, weight, and alcohol or tobacco consumption. If you identify areas that can be improved, set goals and take the series of steps needed to achieve them. Getting regular mamograms and medical care, and receiving treatment for identified problems is necessary for everyone regardless of risk or use of medication.

If, in addition to lifestyle modification, you are considering medication, ask yourself the following questions.

### Developing a Strategy

1 Is it necessary to do anything? Review your Personal Risk Assessment form. If your lifestyle is healthy and you have no increased risk for breast cancer you may not need to do anything else. If you have a slightly increased risk and are premenopausal, you may wish to delay a decision about medication until menopause when the advantages of medication are greater.

2 What are your goals of treatment? Is it to prevent breast cancer, prevent other diseases (heart attacks, osteoporosis, etc.), or some combination of them? Is your goal more to reduce your anxiety about cancer or to change your statistical chances? If the primary problem is anxiety about cancer, then address that directly with either support from friends, counselors, or with specific treatment for anxiety.

3 What is your personal style of health care? If you wish to prevent disease, do you rely primarily on lifestyle or medication/vitamins? Do you have limitations on your lifestyle that would prevent you from maintaining a rigorous exercise and nutritional program? These might include a preference for a sedentary lifestyle, prior failed attempts to change diet, physical limitations preventing vigorous exercise, etc. Consider your current lifestyle (family and professional demands) and whether this could accommodate another change. If you rely primarily upon taking pills (and are taking vitamins and supplements for disease prevention), consider the scientific basis for your choices and whether that provides adequate assurance of their effectiveness.

4 What level of risk are you willing to tolerate? Are you satisfied only if you are doing everything possible? Recognizing that it is not possible to guarantee that you won't get cancer, where is your comfort zone? What compromises are you willing to make between what is practical and what is ideal? You may wish to set a series of small goals and then reevaluate them every three months.

5 How do you make decisions? When you play cards or a game, do you play to win (and take chances) or do you play not to lose (avoid taking risks)? Do you tend to make decisions after careful analysis of all the facts or more intuitively, trusting your gut feelings? (A balance between both styles is best.) Are you more likely to take a “wait and see” position or act quickly and decisively? You may wish to get feedback from your friends about your plans and decision making process.

## **Making a Plan**

The following hypothetical “case histories” illustrate how different woman might approach breast cancer prevention. They represent different ages, cancer risks, life styles and decision making processes.

1 Laura is a 42 year old, premenopausal manager in a computer company. Her mother had breast cancer at age 38 and a maternal aunt had breast cancer at age 50 and a second breast cancer at age 58. There is a moderate family history of heart disease on her father’s side. Laura’s menses started when she was 12; she had her only child at age 32. Laura is on a low fat (20-25%) diet, drinks 2 glasses of wine with dinner and exercises 3 days/wk at the gym, keeping her close to her ideal weight. Professional and family demands are stressful, leaving her little free time.

After examining her risks, she correctly concludes that she is at high risk for breast cancer. She prefers not to take medicine and considers what changes in lifestyle she could make to get a 50% decrease in risk. Realistically, she could not devote the time to exercise at marathon-runner levels. She is willing to make additional changes in diet to achieve an 18-22% fat diet and reduce her wine to 4 glasses/wk.

Laura recognizes that these changes will help but will not give her the sense of security she wishes. She is not particularly anxious, her style is analytical and she tries to avoid risks if possible. Based upon the evidence from the tamoxifen trial she decides to use this medicine for 5 years. She recognizes that in 5 years new information will be available and she will consider her options then.

2 Sandra is a 51 year old perimenopausal writer. Her older sister had bilateral breast cancer at ages 54 and 59. One brother had a heart attack at age 45, another brother at age 47. Sandra’s menses started when she was 11; she had her first child at age 24, her second at age 26. She has had 2 breast biopsies, both abnormal but not cancer. Her cholesterol is high, her blood pressure is controlled on medication. She does not drink alcohol. She is 20 pounds overweight; she tries to stay on a low fat diet with only modest success. She walks 2 miles daily with her dog.

At her doctor’s suggestion she tried hormone replacement but could not tolerate the side effects. She is more concerned about breast cancer (several friends have recently been diagnosed) than she is about heart disease. She tends to make decisions intuitively and senses that she must do something but is not sure what. She has read about both tamoxifen and raloxifene and can’t decide between them. She would prefer the one that would give her the most certain protection

After discussing her situation with her doctor she gets a bone density test which shows no evidence of osteoporosis. She chooses tamoxifen because it has been used longer and its side effects are better known. She agrees to continue annual gynecology exams and to report any signs of bleeding or blood clots. She is willing to switch to raloxifene if there is any evidence of abnormal uterine bleeding.

3 Rosa is a 64 year old grandmother and retired dentist. Her mother died of a stroke at age 52. Two aunts had postmenopausal breast cancer and osteoporosis. Her father died of heart disease in his 60’s. Rosa’s menses started when she was 10 1/2 and she went thru a natural menopause at age 56. She took estrogen for 6 years and stopped when she had a breast biopsy which showed atypical cells. Her cholesterol has come down from 280 to 220 because she follows a low fat (20%) diet carefully and swims 45 minutes 4 days/week.

Rosa tends to be anxious and wants to avoid cancer if at all possible. She took the estrogen because it was recommended to prevent osteoporosis. A bone density test at age 55 showed a marked increased risk of both spine and hip fracture. A repeat test shows that her bones had improved so she was willing to continue the estrogen. When she had the abnormal breast biopsy, however, she quickly stopped it and started taking multiple vitamins, minerals, and herbs.

When tamoxifen was suggested as a replacement she was grew concerned about the increased risk of uterine cancer and refused to consider taking it. She has read about raloxifene and wants to try it. She is reassured by its demonstrated effect on osteoporosis and its lack of effect on the uterus. She chose raloxifene over other drugs for osteoporosis because she also wanted breast cancer protection.

4 Elizabeth is a 55 year old homemaker who had breast cancer when she was 43. The original tumor was 1.8 cm, had negative nodes, and was estrogen/progesterone receptor negative. She received CMF chemotherapy which precipitated menopause. She started menstruation at age 12 and had the first of her 3 children when she was 24. There were no relatives with cancer of any kind but both her mother's and father's families have had premature heart disease. Her grandmother had osteoporosis and died after a broken hip at age 73.

Elizabeth has an active lifestyle though she does not exercise regularly. She quit smoking when she was diagnosed with breast cancer. She has multiple food intolerances and avoids red meat and spicy foods, preferring vegetables and fruit. With pressure from her doctor she takes calcium supplements and is on medication for high cholesterol and high blood pressure. She would prefer to just "get on with her life" and not think about either past or possible future health problems.

Her doctor persuaded her to get a bone density test which showed osteoporosis. Now he suggests that Elizabeth take either tamoxifen or raloxifene, not as adjuvant treatment for her original cancer, but to treat her established osteoporosis, reduce her risk of heart disease (she has multiple risk factors including family history, prior smoking, etc.), and reduce her risk of a second breast cancer. Elizabeth doesn't think she will get another cancer (though her risk is about 10% over the next 25 years) but is willing to "take something to avoid a dowager's hump" like her grandmother's. Her doctor chooses raloxifene though he equally could have selected tamoxifen.

## **CONCLUSION**

Minimum recommendations for breast cancer prevention include a fat-reduced diet, exercise at least 4 times/week, and less than 1 alcoholic drink per day. The information in this paper should help you understand whether you should consider medication as part of your strategy. This paper is not a substitute for seeing a physician knowledgeable about cancer prevention. Use it as a starting point for an ongoing conversation with her or him. As an informed patient you will be in a better position to ask the correct questions and reach the best decisions.

## PERSONAL RISK ASSESSMENT

CURRENT AGE \_\_\_\_\_

Name \_\_\_\_\_

### Hormone and Reproductive History

- 1 Age when menstrual periods started: 10-12yo (RR 1.3)\_\_\_; above 12 (RR 1.0)\_\_\_
- 2 Age when you delivered first child: 15-19yo (RR 0.5)\_\_\_; 20-24yo (RR 1.0)\_\_\_  
25-29yo (RR 1.5)\_\_\_; 30-35yo (RR 1.9)\_\_\_  
after 35 (RR 2-3)\_\_\_; no child. (RR 3.0)\_\_\_
- 3 How many children have you had? \_\_\_\_ (More children, esp. while young, lowers risk.)
- 4 Approximately how long (total) did you nurse them? 0 mo\_\_\_; 1-6mo\_\_\_; 7-12 mo\_\_\_  
more than 12 mo\_\_\_. (Longer time nursing lowers risk.)  
(The use of birth control pills does not influence the incidence of breast cancer.)
- 5 Have you gone thru either natural or surgical menopause? Yes\_\_\_; If not, skip Quest. 6.  
age 35-40 (RR 0.5)\_\_\_; age 40-50 (RR 1.0)\_\_\_; age 50-55 (RR 1.3)\_\_\_; age >55 (RR 1.5)\_\_\_
- 6 Have you taken estrogen replacement? Never\_\_\_; 1-5 yr (RR 1.2) \_\_\_; >5 yr. (RR 1.4)\_\_\_

### Family History

For parents, brothers and sisters (first degree relatives), note whether they have had any of the following diseases and when they first were diagnosed. For grandparents, aunts and uncles (second degree relatives), note how many had these diseases.

	Breast Cancer	Other cancer	Heart Disease	Osteoporosis	Hi BP	Hi Cholesterol
Mother	_____	_____	_____	_____	_____	_____
Father	_____	_____	_____	_____	_____	_____
Sister	_____	_____	_____	_____	_____	_____
Sister	_____	_____	_____	_____	_____	_____
Sister	_____	_____	_____	_____	_____	_____
Brother	_____	_____	_____	_____	_____	_____
Brother	_____	_____	_____	_____	_____	_____
Brother	_____	_____	_____	_____	_____	_____
Grandparent	_____	_____	_____	_____	_____	_____
Aunt	_____	_____	_____	_____	_____	_____
Uncle	_____	_____	_____	_____	_____	_____

No first degree relative (RR 1)

1 or more first degree relative, premenopausal (RR 2.0-3.1)

1 or more first degree relative, premenopausal, bilateral (RR 8.5-9.0)

1 or more first degree relative, postmenopausal (RR 1.5)

1 or more first degree relative, postmenopausal, bilateral (RR 4.0-5.4)

Personal History (check all that apply to you)

Breast biopsy, benign (RR 1.5)\_\_\_ abnormal, not cancer (RR 1.5-2.0)\_\_\_  
Non-invasive cancer, carcinoma in situ (RR 7-12) Breast cancer \_\_\_  
High Blood Pressure\_\_\_ High Cholesterol\_\_\_ Heart disease\_\_\_  
Osteoporosis\_\_\_ Blood clots in legs\_\_\_ Blood clots in lung\_\_\_  
Significantly overweight/obese (RR 1.3-1.7) \_\_\_

Lifestyle

Diet: Vegetarian\_\_\_ meat 2-4/week\_\_\_ meat 5 or more/week\_\_\_  
Alcohol Avg. <1/day\_\_\_ Avg. 1/day (RR 1.0)\_\_\_ Avg. 2+/day(RR1.3-1.8)\_\_\_  
Exercise Sedentary (RR 1.0)\_\_\_ 4 hr/week walking, biking (RR .76-.98)\_\_\_  
4 hr/week aerobics (RR .67)\_\_\_ competitive sports training (RR .48)\_\_\_