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# BREAST CANCER DETECTION

Breast cancer is a common disease, particularly in wealthier, industrialized countries. It occurs in 1 in 11 women in North America at some time in their lives. The earlier the stage of breast cancer at which a woman is diagnosed and goes for treatment, the higher her likelihood of surviving for a long period of time afterwards free of disease. Therefore, a lot of research has gone into finding ways to detect breast cancer at an earlier stage. Detecting breast cancers earlier means that the 5 or 10 year 'cure' rates go up without any new breakthroughs in treatment. It should be remembered, however, that early detection of a disease is not the same thing as prevention. Procedures such as pap tests for cervical cancer, breast self-exam and physician exam for breast cancer are often misleadingly promoted to the public as cancer prevention. Although women may choose to screen themselves to increase their chances of survival by finding cancer early, no fewer women will get breast cancer because of screening procedures. Mammography, one screening procedure for breast cancer, is known to increase a woman's risk of getting breast cancer because it exposes her to x-rays.

Much more money has been put into research on sophisticated technology to detect breast cancer at an early stage than into research on what the causes of breast cancer are which can be eliminated from our environment. The reasons for this are political, and are related to what sources of funding are available for cancer research.<sup>1</sup>

## INTERPRETING CANCER CURE STATISTICS FOR EARLY DETECTION

When judging the true value of a procedure which detects cancer earlier than it would have otherwise been found, the idea of 'lead-time' should be taken into consideration. If a woman survives longer after a smaller tumour is found, does earlier treatment cause her to survive longer? Or is she surviving longer because she has more 'lead-time'; she is, for instance, 4 years into a disease which will take 10 years to kill her, rather than 6 years into the same disease? Cancer cure rates are reported in terms of 5 year and 10 year cure rates. Sometimes, people will get recurrences and die of cancer more than 5 or 10 years after they are diagnosed. One study of 14,731 women with breast cancer in Norway showed that women continued to die of the disease 18 years after diagnosis.<sup>2</sup>

On the average, breast cancers are estimated to double in diameter every 300 days.<sup>3</sup> Therefore, a fair comparison of survival rates for women whose breast cancers were detected at 1 cm. diameter vs. 2 cm. diameter would include almost an extra year of follow-up for the women with the 1 cm. tumours. Otherwise, a woman diagnosed at 51, who died at 57 would be considered a 5 year 'cure' whereas she would not be considered 'cured' if she had not been diagnosed until she reached 52 or 53 and had still died at 57.

## SCREENING OF WOMEN WHO HAVE NO SYMPTOMS OF BREAST CANCER:

### BREAST SELF-EXAM

A detailed description of breast self-exam is included in this packet. The advantages of breast self-exam are that a woman becomes familiar with what her breasts normally feel and look like, and she can find changes

and lumps much more easily than a doctor who only examines her once a year. Monthly breast self-exams also mean that a lump is found as soon as it is large enough to be felt. 90% of breast lumps are discovered by women themselves or their lovers. Practicing breast self-exam does not have any harmful side effects, and it is something which can be easily learned if the time is taken to teach it properly.

In one study of over 1000 women diagnosed as having breast cancer, 75% of the women who performed breast self-exam survived 5 years past diagnosis, as compared to 57% of the women who did not perform breast self-exam. The women who did not practice self-exam has a larger average size of breast lump when the lump was first discovered.<sup>3</sup> Allowing for as much as a 3 year 'lead-time' survival rates for women who performed breast self-exam were still higher. Because the lumps had been found earlier, spread of the cancer to the lymph nodes and beyond had occurred less often. In at least 3 studies in which women were being screened once a year by mammography and physician exam, about one third of the women found their breast cancer themselves during the period of time between screenings.<sup>3</sup>

Breast self-exam has other advantages besides its simplicity, safety, and effectiveness. A woman can feel a sense of control over her own health care by knowing she is responsible for checking her own breasts. And a woman can become more familiar with what her own body feels and looks like.

Breast self-exam is sometimes dismissed as an effective tool for screening for breast cancer because many women do not regularly examine their breasts. Many women have never learned how to do a thorough breast exam. This simply means that more time and energy need to be put into teaching breast self-exam.

Women often do not perform breast self-exam because of fear of cancer, fear of the mutilating treatments used for breast cancer, or because they think that breast cancer will not happen to them. Learning to do self-exam in a supportive environment among other women can help to counter some of the fears that surround it. It is also helpful to know that by far the majority of lumps women find are non-cancerous. Within conventional medicine, less mutilating treatments than mastectomy are now available for breast cancers found at an early stage.<sup>4</sup> Alternative treatments which attempt to strengthen a woman's own immune response are likely to work better at an earlier stage of a disease.

### PHYSICIAN EXAM

This procedure is essentially identical to breast self-exam, except that it is done once a year by a doctor. The advantages are that it is safe, and that a woman who is not performing breast self-exam will have her breasts examined once a year. The disadvantages are that a doctor will not be as familiar with a woman's breasts as she can become with monthly self-exam, so minor changes may not be as easily noticed. Also, by trusting in a doctor to have more 'expertise' in examining her breasts, a woman can lose a potential sense of control over her own health care.

### MAMMOGRAPHY

Mammography is an X-ray examination of the breast. Two x-ray photos of each breast are taken.

Mammography is the only procedure known to be able to detect breast cancer when it is so small that a lump cannot yet be felt. Some cancers have been identified by mammography as long as 2 years before they would have reached a size at which they could have been felt.<sup>5</sup>

#### Risks:

There is a lot of controversy surrounding the use of mammography as a tool for screening women who do not have symptoms of breast cancer. X-radiation is known to cause breast cancer. Although the newest mammography equipment uses a much lower dose than equipment used 10 and 20 years ago, there is no known threshold low dose of radiation below which it will not cause cancer. It is assumed that the lower the dose, the less new cancers produced per year per million women. No one disputes, however, that some breast cancers which would not have otherwise occurred will occur because of exposure to x-rays.

Because the radiation dosage per examination differs depending on what equipment is being used, it is important to find out what the exposure level will be for a total exam before going for a mammography. If more than one facility is available, check what the exposure levels are at each facility and go to the one with the lowest dose. Higher doses of x-rays do not mean that the mammography will be more accurate. It is also important to find out how recently the equipment was checked for patient exposure level.

A 35 year old woman has a risk of developing breast cancer some time in her life of 9% (i.e. one in 11 women will develop the disease). If the woman receives an annual mammogram from age 35 to 70 at the exposure level of 1 rad per year, her risk has been calculated to rise to about 12%.<sup>5</sup> Presumably, then, if all women in North America had mammograms of 1 rad dosage annually from age 35 on, between 1 in 8 and 1 in 9 women would get breast cancer! This is a substantial increase in breast cancer risk.

Mammography is not a risk-free procedure. It is therefore very important that it not be over-used. Studies of its usefulness for screening women with no symptoms are still under way. The first large study was conducted by the New York Health Insurance Plan. It showed that women over 50 who had annual mammograms had less deaths from breast cancer because their cancers could be detected and treated earlier. However, for women under 50, mammography was of no advantage. There are several reasons for this:

1. most breast cancer occurs in women over 50 (about 80% over 40 and 65% over 50)<sup>6</sup>
2. the breasts of younger women are denser and more glandular, and mammography is less accurate in finding tumours in dense glandular breasts than in the looser breasts of older women.

A large study of the usefulness of mammography is now underway in Canada, for women aged 40-59.

#### Accuracy:

In all the studies of mammography vs. physical exam, some cancers are found through mammography alone, some through physical exam alone, and some through a combination of both methods. Mammography should therefore never be depended on to screen for breast cancer without physical exams such as breast self-exam or physician exam.

The accuracy of mammography is generally reported to be 85%-90%.<sup>7</sup> There are reports of accuracy being better on newer than older equipment. Mammography does produce some false-positives as well as false negatives. That is, it can be interpreted as showing

breast cancer when a biopsy later shows a woman does not have cancer. It's therefore important always to have a surgical biopsy after a mammography result comes back as positive for cancer.

In the large HIP study of screening by mammography, 48 women diagnosed as having 'minimal cancers' were later diagnosed by pathologists as not having cancer. 37 of these women had already had mastectomies when the pathologists decided that they did not after all have cancer.<sup>7</sup> One of the horrors of the situation is that although the mistake was reported in the medical literature, the women themselves were never told directly. Instead, it was left up to the surgeons involved, who may not have wanted to tell their patients and leave themselves open to malpractice suits.

#### Minimal Cancers:

Mammography is acclaimed for its ability to detect very small or 'minimal' cancers less than 1 cm. in size. For women with minimal breast cancer, 20 year survival rates have been calculated to be more than 95%.<sup>8</sup>

The term minimal cancers includes both very small cancers which are invading surrounding tissue, and clusters of cancerous cells which are not spreading into or invading surrounding tissue (carcinoma in situ).<sup>8</sup> Carcinoma in situ does not always progress to become invasive, or spreading, cancer. It may remain in the form of a tiny or microscopic tumour in one spot, and may have no ill effect on a woman's health. There are 2 types of breast 'carcinoma in situ', ductal and lobular. Lobular carcinoma in situ occurs in the milk-producing lobes of the breast; ductal carcinoma in situ occurs in the ducts, or passageways, leading from the lobes to the nipple. Only about a quarter to one third of women with lobular carcinoma in situ who receive no treatment will develop breast cancer.<sup>9</sup> The cancer is equally likely to develop in either breast, regardless of which breast had lobular carcinoma in situ.<sup>9</sup> More than a third of the cancers develop more than 20 years after the diagnosis of lobular carcinoma in situ. Lobular carcinoma in situ usually occurs in women before menopause, and there is some speculation that it can regress by itself after menopause because of hormonal changes.

About 50% of women with ductal carcinoma in situ will develop invasive (spreading) breast cancer.<sup>8</sup>

It's been suggested that the higher survival rates being reported for women with minimal cancers detected by mammography alone is inflated because it includes women who would have survived anyway, without diagnosis and treatment.<sup>7</sup> Tiny tumours which may grow so slowly that they would never produce any symptoms or become life-threatening within a woman's normal lifespan may be included as cancers found early and cured because of mammography. There is also concern that through mammography more questionable diagnoses are being made, particularly of poorly understood pre-cancerous conditions, and more women are being subjected to unnecessary surgery for conditions which are not invasive cancer.

For example, for lobular carcinoma in situ standard medical treatments range from:

1. Removing the lump and considering the woman to be at higher than average risk for developing breast cancer later.
2. Mastectomy, removing the breast with lobular carcinoma in situ as though the woman had invasive cancer in that breast already.
3. Bilateral prophylactic mastectomy. This is the removal of both breasts. Prophylactic removal means that it is preventative removal; breasts which are essentially

healthy are being removed in case they become cancerous. Both breasts are removed because there is no way of guessing which breast might eventually develop cancer.

For either of the two last options, most of the breasts removed would never have developed cancer. Of those women who would have developed cancer, many would not have done so until many years later, at which time a woman could decide whether to have a mastectomy.

#### Frequency of Mammography Screenings:

In North America, studies of the usefulness of mammography always use annual screenings. This is based on the tradition of annual physical exams by a doctor for breast cancer screening. Recommendations for how frequently women should have mammography before age 50 vary from no mammography to a 'baseline mammography' between age 35 and 40 and subsequent mammographies every 2 or 3 years. After age 50, medical organizations generally recommend annual mammographies.<sup>10</sup>

In Sweden, a country with one of the highest incidence of breast cancer in the world, a large study is under way in which women are being screened by mammography once every two years from age 40-49 and once every thirty-three months from age 50 onwards.<sup>11</sup> The timespan between screenings was set on the basis of breast cancer biology. When a woman is pre-menopausal and has breast cancer, her cancer is likely to grow faster than breast cancer in a woman past menopause.

The Swedish study so far shows a reduction in mortality with early detection by mammography for women over 50 similar to North American studies which use more frequent screenings. A single exposure mammogram ("medio-lateral oblique view") is being used in the study. As in North American studies, the study shows no real benefit to using mammography to screen women under 50.

#### Deciding Whether to Have Mammographies:

Women without any symptoms of cancer are increasing their risks of getting breast cancer if they have mammographies once a year. If a woman has mammographies less often and if the equipment produces a very low radiation dose, such as .3 rad/exam, her risk is increased less but is not eliminated. Also, a woman who is over 50 knows that there is some evidence that mammography will be useful in detecting a cancer earlier. For a woman under 50 the evidence of its usefulness is flimsier. There is no proven usefulness to 'baseline' mammographies for women in their late 30's and 40's, especially as the breasts of women change in texture due to age, pregnancy, and nursing.

If a woman is older when she has a mammography, for instance in her late 60's or early 70's, the risks of developing breast cancer during her lifetime due to radiation exposure decrease, because breast cancer has a latency period of 10-20 years. The latency period is the period of time between exposure to a cancer-causing agent and developing cancer that can be detected.

Many women with no signs of breast cancer may decide that early detection through monthly breast self-exam is adequate for them, and that they do not want to use a method of detecting breast cancer which increases their risk of getting the disease.

Mammography is known to be useful:

1. When a cancerous tumour has been found, to look at the rest of the breast and the opposite breast to make sure there is no other cancer present.
2. To evaluate a lump or change in the breast which may or may not be cancerous if mammography will help to determine if a biopsy should be performed.

3. To search for previously unseen breast cancer in a woman whose lymph nodes close to the breasts are known to contain cancer.

For women who know that they are at especially high risk of developing breast cancer and who therefore are concerned that any cancer they develop be detected as early as possible, mammography is likely to be worth a relatively small increase in risk.

These women include:

1. Women who have already had breast cancer in one breast
2. Women with 2 close family members who've had cancer in both breasts before menopause
3. Women who have had localized non-invasive cancerous conditions such as lobular or ductal carcinoma in situ.
4. Women who have had a type of breast lump thought to be pre-cancerous such as lobular hyperplasia, apocrine metaplasia or ductal hyperplasia

There are many other women who have characteristics which may make them at higher than average risk for developing the disease and who may or may not decide to increase their risks further by undergoing mammography. These include, for example, women who have had a close family member (mother or sister) with breast cancer or women who have taken post-menopausal estrogens for a lengthy period of time, or at a high dosage, etc.

There are many other 'risk factors' for breast cancer, which have been documented to a greater or lesser extent, ranging from having taken high progesterone birth control pills, having taken DES during pregnancy, being on thyroid supplements long-term, having no children, or being Jewish, white and upper middle class. The problem is that many risk factors have not been well established and often the degree of increased risk is disputed. A study which followed a large group of women and applied 10 established risk factors which were either cultural or related to reproductive history to guess who would be most likely to develop breast cancer was only accurate one quarter of the time.<sup>12</sup> Therefore, little is known about who is really 'high-risk'. A woman who knows that she is at somewhat higher than average risk could either decide that early detection is very important to her and have mammographies, or that prevention is very important to her and avoid mammographies.

#### OTHER VISUALIZING TECHNIQUES:

Unlike mammography, thermography, ultrasonography and diaphanography have not been proven capable of detecting cancers too small to be felt. They are therefore useful for additional information for women with symptoms, and not, at their present level of technical development, for screening of women with no symptoms.<sup>13</sup>

#### ULTRASONOGRAPHY OR ULTRASOUND MAMMOGRAPHY:

Ultrasonography uses high-frequency sound waves to look at the interior of the breast. A woman leans over a basin of warm water so that her breasts are immersed during the ultrasound exam. Ultrasound does not have the known risks associated with x-ray exposure, although it has not been in use for as long, so long-term effects may still be unknown.

For younger women (under 50) with breasts which are denser and more glandular, cancers can often be detected more accurately with ultrasound than with x-ray mammography.

Simple fluid-filled cysts are easily differentiated by

ultrasound although with mammography they may be confused with solid tumours. Ultrasound is less accurate than mammography in distinguishing solid benign lumps such as fibrous cysts from breast cancer.

There have been some individual reports of tumours too small to be felt being detected by ultrasound, but ultrasound has not been proven to be useful for early detection in any large scale study.

#### **THERMOGRAPHY:**

This technique produces a detailed map of the pattern of heat emitted from the breast. Each woman's breasts will produce a characteristic 'thermal map' which is unlike that of another woman. Usually the 2 breasts are fairly similar, and if there is a large difference in the pattern it can be an indication that something is wrong. A cancerous breast usually produces more heat than normal. However, other non-cancerous processes such as inflammation can also cause heat. Pregnancy and where a woman is in her menstrual cycle also affect the heat pattern from a breast.

Thermography is not very accurate. In one study, thermography was found to have a 45-47% rate of 'false-positives' — calling a healthy breast cancerous. It should therefore only be used as an additional tool to help with a diagnosis.

#### **DIAPHANOGRAPHY:**

This is a process which uses intense light shining through the breast to get an image of the interior of the breast. Photographs are taken with highly sensitive color film. Both benign disease and cancer can cause changes in the shades of colours because of differences in protein concentration. They can also distort the patterns of veins and arteries.

Fluid-filled cysts will appear translucent and pale, fibrous cyts will look brownish or deeper red, and cancers range from brown to dark grey, with irregular margins.

Women's breasts differ in how easily light can shine through them. For some women, mammography may not be useful because of the density of the breast tissue, but diaphanography will provide a clear picture.

Diaphanography is a very newly developed technique which has not been in use for long, although it is based on an old concept of shining a light through a woman's breast. The accuracy of diaphanography is therefore not well documented. It can provide a useful additional tool for diagnosis of a breast lump, or for regular screening for recurrences in a woman who has already had breast cancer.

The advantage of using diaphanography is that light is not known to have any harmful effects.

#### **BREAST PAP SMEARS:**

("Exfoliate Cytology of the breast")

This test can be used if a woman has a nipple discharge. It can also be used for screening in women with no symptoms if a bit of fluid can be massaged or suctioned from a woman's nipple. Cells in the fluid are examined under a microscope to see if they look normal. If abnormal cells are found, fluid which will show up in an x-ray is pumped through a hair-thin tube into the breast ducts, and an x-ray of the network of ducts is taken. This will often show the source of the abnormal cells.

The advantages of the breast pap smear is that it is simple and inexpensive and sometimes cancers too small to be felt can be found.

The disadvantage is that often no fluid can be extracted from the nipple, or fluid can be extracted from only

one breast. Critics also say that it is impractical as it does not find many cancers. Some women find the suction cup used to extract fluid from the breast uncomfortable. The pressure can be adjusted by the person operating the cup, so a woman should ask for less pressure if it's uncomfortable.

#### **NEEDLE BIOPSIES:**

There are two types of needle biopsies, fine needle, which removes fluid, and wide needle, which removes a core of tissue from a lump.

Women may fear that if their breast lump is cancerous, the cancer will spread along the needle track after a needle biopsy. One study of 18,000 people who had needle biopsies for another type of cancer (of the thyroid) did not show a single case of spread of cancer along the needle track.<sup>10</sup>

##### **Fine Needle Aspiration Biopsy:**

If a woman has a breast lump which is fluid-filled, fine-needle aspiration biopsy can be used to remove the fluid from her lump. The fluid is then sent to a lab to see if it contains any cancerous cells. Fine-needle aspiration biopsy can be done in a doctor's office, with local anaesthetic or no anaesthetic. It is about 90% accurate.<sup>10</sup>

##### **Wide Needle Biopsy:**

If no fluid can be removed from a breast lump, a wide needle biopsy can be performed, removing a core of tissue from the lump. This procedure is only considered accurate if it shows cancer to be present. If no cancer is found, it may be because the core of tissue did not come from the part of the lump containing cancer cells. Therefore, a surgical biopsy is always done if a wide needle biopsy comes back negative. Many physicians automatically perform surgical biopsies on lumps from which fluid cannot be withdraw, because of the inaccuracy of wide needle biopsy.

A wide needle biopsy can be performed at a doctor's office with local anaesthetic.

#### **SURGICAL BIOPSY:**

When a surgical biopsy is done, the lump is removed and then analyzed to see if it contains any cancer. Infrequently, an 'incisional' biopsy will be done on a large lump, removing only part of the lump.

Surgical biopsy may be done either with local anaesthetic in a doctor's office, or under general anaesthetic. Until recently, women had surgical biopsies with the understanding that their breast would be removed while they were still unconscious if the lump was cancerous. It is now recommended that a surgical biopsy be performed separately from any major breast surgery, so a woman can have a more accurate diagnosis, and so she has time to consider what sort of treatment to have if she does have cancer. If a woman does decide to have a mastectomy, she has time to acknowledge to herself that she will have her breast removed before it happens. Under the old 'one-step' system combining surgical biopsy and mastectomy, a woman went under the anaesthetic not knowing whether she would wake up with one less breast.

Surgical biopsies should be done so that the cut made to remove the lump follows the natural contour of the breast.

When a surgical biopsy is taken, it is important to make sure that if the lump is cancerous, estrogen and progesterone receptor tests are performed on the tissue. These tests will show how responsive the cancer is to hormones. They can give a woman more information

about her chances for recovery and survival, because they can indicate if her cancer is of a slower or faster growing type. They also show whether hormone therapy will be useful if she has a recurrence of cancer. The tests must either be done immediately when the lump is removed, or from a frozen section if the tissue is frozen within 15 minutes of its removal.<sup>14</sup>

#### DIAGNOSIS OF CANCER:

If a woman does definitely have breast cancer, as shown by a biopsy, there are several other diagnostic procedures which she should go through before considering surgery. These will show whether her cancer has spread beyond her breast. They include:

- a chest x-ray, to see if there are tumours in the lungs or on the ribs
- blood and urine studies, which can show if liver or bone tumours are present
- a liver and a bone scan

It is important to insist on these tests even if your breast tumour is small. Although a small tumour is much less likely to have spread to other body organs, this has sometimes already occurred. If the cancer has already spread beyond the breast, radical breast surgery is useless.

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