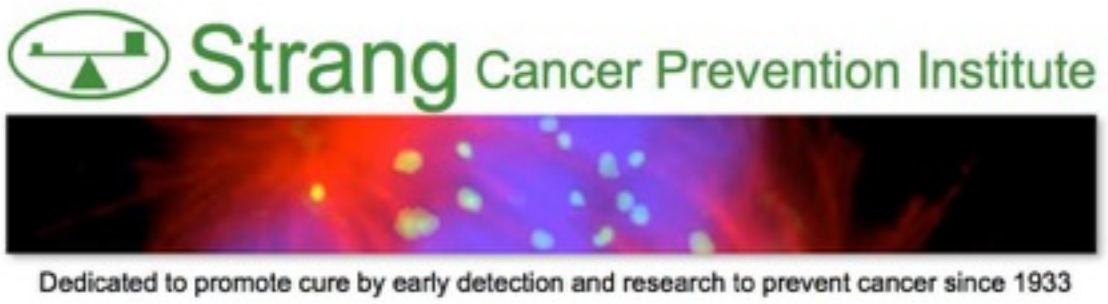


BREAST CANCER

Screening trials have shown about a 30% reduction in the risk of dying of breast cancer. However the screening process can cause anxiety, especially if the patient is recalled for further studies; this occurs in about 10% of women screened. There are false positive results which may result in a biopsy that turns out not to be cancer. One group of patients who have duct carcinoma in situ may be over-treated as not all will go on to develop invasive breast cancer. As it is not possible to determine who will or will not develop cancer most are treated

1. Guidelines for Screening

Risk factors:

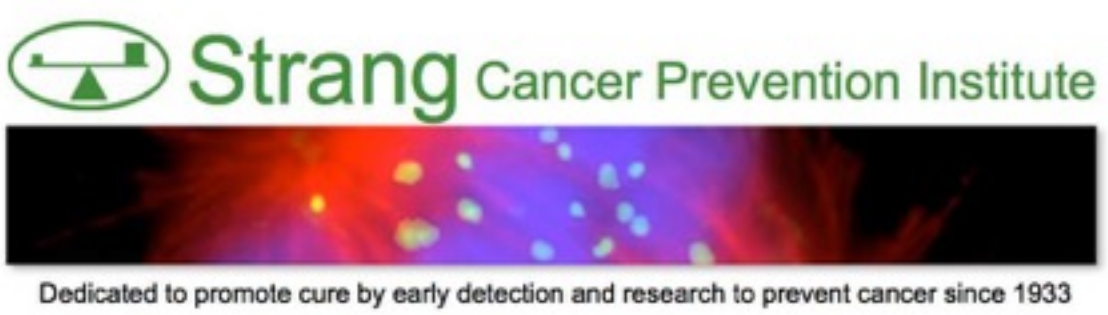
Average risk:

Age ≥ 40 years

High risk:

Strong family history of breast cancer
Gene mutation carriers:
- BRCA 1 or 2
- CHEK2
- CDH1 (Hereditary diffuse gastric cancer syndrome)
- TP53 (Li-Fraumeni syndrome)
- PTEN (Cowden syndrome)
- STK11/LK B1 (Peutz-Jeghers syndrome)
- ATM (Ataxia Telangiectasia)
- Kasabach Merritt syndrome

Ductal or lobular atypical hyperplasia identified in a breast biopsy
Lobular carcinoma in situ
Radiation for Hodgkin's disease at a young age
Prior breast biopsy



Average Risk:

Breast Self-Examination (BSE)

Women aged ≥ 20 y should be informed about the benefits and limitations of BSE. Breast awareness should be recommended and any new breast symptoms should be promptly reported to a health professional. Women who choose to do BSE should be instructed in the technique at the time of their periodic health examination. Women can chose either to do BSE or not either regularly or irregularly

Clinical Breast Examination (CBE)

Clinical breast examination is recommended for women 20 – 30 as part of their periodic health examination which should be approximately every three years. Women ≥ 40 should have an annual CBE

Mammography

Begin annual mammography at age 40 y

High Risk:

Enhanced Screening (Surveillance)

Enhanced surveillance is best conducted in a 'Breast Surveillance Program' segregating women at increased risk from those with a diagnosis of cancer:

BRCA and other mutation carriers

A family history of a first-degree relative with a BRCA mutation who has not been BRCA tested

A family history suggestive of an autosomal dominant genetic inheritance predisposing to breast cancer

Women treated for Hodgkin's disease with mantle radiation therapy are recommended to have an annual mammogram and breast magnetic resonance imaging (MRI) starting

at age 25 years or 8 years after the radiation — whichever occurs last

Women with >20% lifetime risk should start annual screening with MRI at age 30 y. Annual mammography with sonography and annual MRI should be separated by six months to allow for imaging twice a year
Women with a 15-20% risk and those with a diagnosis of atypical epithelial hyperplasia or lobular carcinoma in situ are not eligible for annual MRI unless their Gail or Tyrer-Cuzik risk level is high enough. Studies of the efficacy of MRI for early diagnosis are currently underway in these increased risk populations

2. Cancer Prevention

Individuals at high risk for breast cancer may be offered medication which can reduce the risk of breast cancer by 50% but have side effects and adverse reactions such as a small increase in endometrial cancer, deep vein thrombosis and pulmonary embolism

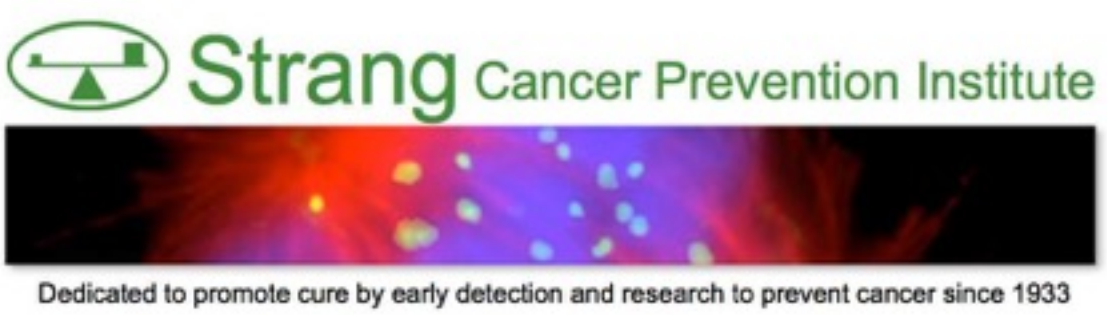
Cancer prevention for women at enhanced risk of breast cancer is also best managed in a 'Breast Surveillance Program' with defined criteria for accrual. The surveillance program is optimally staffed by a physician familiar with breast cancer risk and clinical examination, and ready access to breast imaging, pathology, medical oncology, oncology nursing, genetic counseling, nutrition and lifestyle counseling and a clinical psychologist. A 'Breast Surveillance Program' requires a protocol for standard management following NCCN guidelines as a minimum

Recommendations for Primary Prevention (risk reduction)

Women at increased risk for breast cancer (>20% lifetime risk) are candidates for enhanced screening (surveillance) and preventive medications.

The following tools can be used to assess risk:

1. **Gail Model**
   General measure of risk based on multiple factors: age, ethnicity, history of breast biopsy, age at menarche, parity and age at first live birth. The Gail model only takes into consideration first-degree relatives diagnosed with breast cancer
   www.cancer.gov/bcrisktool/



2. BRCAPRO

Calculates the probability that a particular family member carries a BRCA1 or BRCA2 germ-line mutation, not an estimator of risk, and is used primarily by genetic counselors

https://tools.bcsc-scc.org

3. Tyrer-Cuzick model

Assesses the risk of breast cancer, assuming there is a genetic predisposition to breast cancer in addition to BRCA 1 & 2 over ten years

Strang Cancer Prevention Institute recommends the Tyrer-Cuzick model (Version 7)

www.ems-trials.org/riskevaluator/

Once a woman has been identified to be at enhanced Gail Model 5-year breast cancer risk of ≥1.67%, or using the Tyrer-Cuzick model of a 20% lifetime risk from the individual's current age, there are two options for risk reduction available:

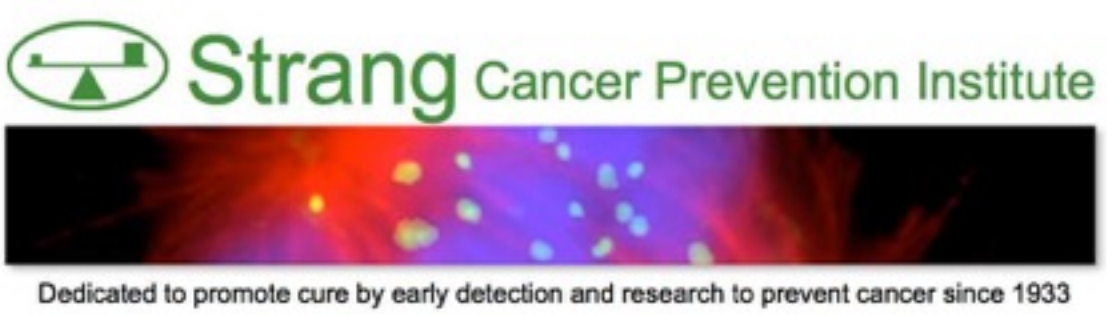
1. Risk reduction using an FDA approved selective estrogen receptor modulator (SERM)
2. Risk reducing (prophylactic mastectomy) with immediate reconstruction in women who are at extremely high risk. BRCA 1 or 2 mutation carriers should be recommended bilateral salpingo-oophorectomy after child bearing

SERMs include the prototype SERM I tamoxifen 20 mg / day for women over 35 years or the SERM II raloxifene 60 mg / day which is indicated for **postmenopausal women only**

Prophylactic (risk-reducing) mastectomy with immediate reconstruction is an option some women who are at high risk, such as BRCA mutation carriers. Advances in reconstructive techniques using implants or autologous tissue (e.g. DIEP free-flap) have made prophylactic surgery more attractive and increasing numbers of women are selecting this option

Special Surveillance Breast Programs for women at increased risk enable coordinated care with state of the art management and with all the necessary knowledge for fully informed shared decision making process in regard to:

1. Imaging – mammography, sonography, breast MRI and tomosynthesis



2. The option for genetic testing and **referral to a genetic counselor**
3. Access to psychological counseling
4. Use of risk reducing pharmaceuticals
5. Risk reducing lifestyle changes
6. Risk reducing surgery

BREAST CANCER SCREENING

BENEFITS AND HARMS - FREQUENTLY ASKED QUESTIONS (FAQs)

What is breast cancer screening?
Mammograms are X-rays of the breasts in eligible women, which can detect breast cancer early before it develops into a lump in the breast. It is combined with a breast examination by your doctor before the mammogram is ordered.

Is the X-radiation exposure a cause for concern?
Mammograms do cause a minimal degree of radiation exposure. Studies show that the risk of exposure is far outweighed by the benefit of detecting early breast cancer.

Can mammograms be replaced by either a sonogram (ultrasound) or an MRI?
Sonograms and MRIs are not substitutes for screening mammograms. Sonography may be used in conjunction with a mammogram if there is a certain type of abnormality.

MRIs are used to screen women, even at a young age, at high risk for breast cancer in conjunction with mammograms and sonograms.

Who should be screened for breast cancer?
Strang Cancer Prevention Institute, the American Cancer Society, the National Cancer Institute, the American College of Radiology and the American Society of Breast Surgeons, amongst others groups, recommend starting screening mammograms at age 40 and do not recommend an upper age limit, which would depend on the individual's state of health.

The United States Preventive Health Services Task Force has recommended screening mammography every two years starting at age 50 to 70. Some physician groups are adhering to these guidelines while others do not. Discuss with your doctor which guidelines are best for you.

Women with a known risk factor such as a strong family history, carriers of a gene mutation (e.g. BRCA 1 or 2), or exposed to radiation therapy for Hodgkin's disease at a young age, should be screened before age 40. The age to start should be discussed with your physician.

What are the benefits of screening?
Screening mammography has been shown to reduce the death rate from breast cancer by about 30%. Early detection makes it easier to treat breast cancer.

How reliable are screening mammograms?

Mammography is between 80% (mostly in premenopausal women) to 90% (mostly in postmenopausal women) accurate. This means that cancers do not show up in 10 – 20% (false negative mammograms).
A clinical breast exam is required each year, just before a mammogram in order to tailor the mammography exam; if the clinical breast exam your doctor performs is not normal, additional mammographic views and ultrasound could be required. That would be a "diagnostic" exam then, which is dealt with differently than a "screening" exam.
Women with dense breast tissue, as described in their mammogram report, may consider having additional screening sonography, which may not be covered by insurance. "Dense breast tissue" is not a clinical finding, but a description of the density of the breast tissue on the mammogram.

How will the results of the mammography be communicated?

The results will be communicated in writing to both the individual undergoing screening and their doctor. If you have not received a letter within thirty days call your doctor's office for the result. Never assume that if you have not been informed the test was normal.

What happens if an abnormality is seen on my mammogram?

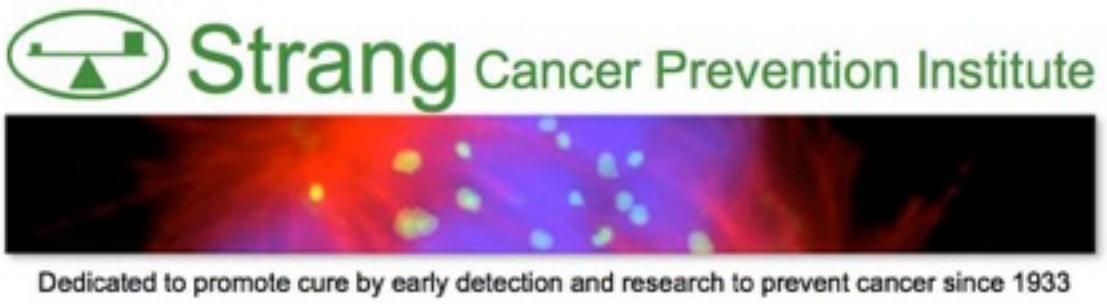
After a screening mammogram about 10% are recalled for further imaging, which can provoke anxiety, but do not panic as the majority of those recalled do not have cancer. The radiologist may order further tests such as special mammographic views, sonogram, MRI, a repeat mammogram and/or sonogram in 6 months, continue annual screening mammography or suggest a biopsy.

How often is a biopsy required?

About one in a hundred women are advised to have a needle biopsy, or occasionally a surgical biopsy, to remove a suspicious abnormality. Two out of three having a biopsy do not have cancer and one in three does have cancer. A needle or surgical biopsy is associated with some pain and bruising, both of which resolve within two weeks.

Does cancer detected on a mammogram always require treatment?
Some very early cancers such as ductal carcinoma in situ (Stage 0) may never develop into invasive cancer. However it is not possible, at present, to predict which will do so; therefore the majority is treated.

What are the potential harms of mammography?
Some of the cancers found may be so slow growing or unlikely to spread that they would not have caused a problem - this is called "Overdiagnosis" and results in unnecessary treatment. It is not possible yet to determine which cancers do not need treatment. There are "False positives" when a mammogram shows an abnormality but it turns out not to be cancer, thus provoking anxiety while the abnormality is being checked.



Mammograms can give false negatives where the mammogram is normal but cancer is present. This occurs in 10% of postmenopausal patients with cancer and in up to 20% of premenopausal women with cancer.

Strang Cancer Prevention Institute has developed and updates guidelines for cancer screening and best practices for cancer prevention. Strang is synonymous with cancer screening and prevention. Strang was the first medical facility to introduce the Pap test into clinical practice which has saved millions of women's lives worldwide. Strang was opened by first lady Eleanor Roosevelt in 1933