



## Market Analysis of Breast Cancer

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Breast cancer is a cancer that forms in the cells of the breasts. Breast cancer can occur in women and rarely in men. The symptoms of the breast cancer include a lump in the breast, bloody discharge from the nipple, changes in shape and size of the nipple or breast. There are 2 types of breast cancer: Non-invasive cancers stay within the milk ducts or lobules in the breast. They do not grow or invade in normal tissues within or beyond the breast. Non-invasive cancers are called as carcinoma in situ (in the same place) or pre-cancers. Invasive cancers do grow in normal, healthy tissues. Most breast cancers are invasive. Depending upon the type of cancer the treatment is determined, i.e., whether it is invasive or non-invasive cancer. Treatment varies depending upon the stage of cancer. It may consist of chemotherapy, surgery or radiation.

Early detection of breast cancer greatly increases the chances of successful treatment and saves the life. There are 2 major components of early detection of breast cancer: educate to promote early diagnosis and screening. There are 3 different types of screening tests available; they are the mammogram, clinical breast exam (CBE) and MRI (magnetic resonance imaging).

### Is Breast Cancer a Modern Illness?

Ancient Egyptians were the first to diagnose, treat and prevent breast cancer more than 3,500 years ago. Breast cancer is now the most well-known and researched cancers in the medical world today. People diagnosed with breast cancer at an early stage have a very good chance of a cancer-free future. But this was not the case earlier. The first case of any type of cancer documented in Egypt was a breast cancer in 1600 BC. Edwin Smith Papyrus, an ancient text found in 1860 in an Egyptian tomb, described 8 cases of ulcers or tumors of the breast. The first doctor, who attempted to treat this type of cancer, wrote: "There is no treatment!" Physicians and medical researchers in ancient period posited the following theories regarding the cause of the breast cancer: humoralism, punishment, divine, lack of sexual activity, physical injuries, fear of breast cancer, without the benefit of 21st-century diagnostics. In ancient times, they used to call it "the wandering womb" where they

believed that the uterus could move throughout the body leaving health problems of every kind in its wake. It was not diagnosed until the 19th century, unless and until the cases of breast cancer increased. But the disease is somewhat controlled with improvement in sanitation and hence the lifespan of an individual is increased.

The first successful treatment for breast cancer was done by French surgeon Jean Louis Petit and later Scottish surgeon Benjamin Bell where the lymph nodes, breast tissue, and chest muscle are removed surgically. Surgeon William Stewart Halsted began performing and perfecting mastectomies around 1882. Halsted's mastectomies were invasive where breasts, lymph nodes, and underlying muscles are being removed and the procedure was deemed necessary to prevent cancer from recurring but often left patients with severe pain and disability.

By the 1970's, researchers began to develop lumpectomy- more limited surgery to remove only the cancerous tumor and any surrounding tissue affected by the tumor.

By 1985, researchers found that radiation followed by lumpectomy gave a chance of survival equal to the considerably more invasive mastectomy.

Around the 20th century, doctors used radiation therapy to shrink the cancerous cells. Chemotherapy became an option. It helped to shrink cancerous cells before surgery and prevent recurrence after surgery and treat cancer that is metastasized or has spread to other parts of the body. Scientists began to experiment with combined treatments to improve outcomes. Throughout the 1970's, this procedure has been continued and this led to a better understanding of how cancer can develop and spread throughout the body. This understanding led to the development of more effective targeted treatments. This approach to treat cancer and research is still continuing today.

In 1923, the first large-scale review of women with breast cancer was done by English scientist Janet Lane-Claydon, which identified several risk factors that are still considered today.

In 1980's and 1990's, thousands of women undergoing breast cancer treatment and high dose bone marrow transplants hoping to have a good result, which turned it to a disaster after the loss of 15-20% of women's life due to the treatment.

In 1995 report from the Nurses' Health Study and 2002 results of research from the Women's Health Initiative concluded that hormone replacement therapies which had become popular among menopausal women could significantly increase the risk of breast cancer.

In the late 1990's, scientists found that certain variants of the genes BRCA1 and BRCA2 are associated with 80% of breast cancer risk. Some women who discover this gene mutation within their genetic makeup will take proactive steps to reduce their risk of cancer, including preemptive mastectomies and even hysterectomies.

As scientists deepen their understanding of the role of genetics in breast cancer risk, research on developing new techniques has been increased. Meanwhile, some research is being done on repair or even replaces harmful genes before breast cancer occurs.

As research continues to improve, there are several chances of every person to survive and can prevent breast cancer or any type of cancer. Taking healthy food, avoiding alcohol and smoking may be an important precaution from developing cancer. Regular self-exams and annual mammograms after 40 years old are recommended.

### What's New in Breast Cancer Research?

Treatments are being evaluated in trials. This includes individual drugs, the combination of drugs, surgical and radiation techniques. Investigations include new types of cancer vaccines, targeted therapy, oncolytic virotherapy, and immunotherapy.

The latest research is reported annually at scientific meetings such as the American Society of Clinical

Oncology, San Antonio Breast Cancer Symposium and St. Gallen Oncology Conference, Switzerland.

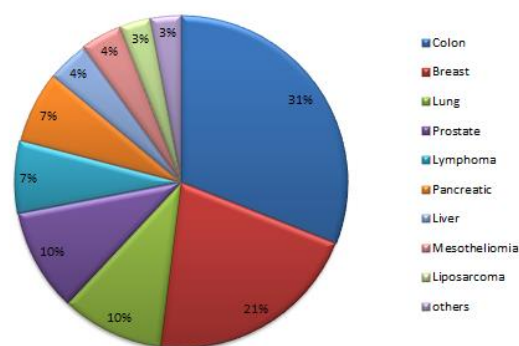
These studies are reviewed by professional societies and other organizations and formulated into guidelines for specific treatment groups and risk category.

Fenretinide, a retinoid (drugs related to vitamin A), is also being studied as a way to reduce the risk of breast cancer.

### Cryoablation

As of 2014, cryoablation is being studied to see whether it could be the subtitle for lumpectomy in small cancers. There is tentative evidence in those with tumors less than 2 centimeters. It can also be used for those, surgery is not possible. Another review stated that cryoablation looks promising for early breast cancer of small size.

**Tumour Types and Differential Percentages**



### Breast cancer cell lines

A considerable part of the current knowledge on breast carcinomas is based on in vivo and in vitro studies, performed with cell lines derived from breast cancers. These provide an unlimited source of homogenous, self-replicating material, free of contaminating stromal cells and often easily cultured in simple standard media. The first breast cancer line described was BT-20, established in 1958. Since then, despite sustained work in this area, the number of permanent lines obtained has been strikingly low.



Indeed, attempts to culture breast cancer cell lines from primary tumors have been largely unsuccessful. This poor efficiency was often due to technical difficulties associated with the extraction of viable tumor cells from their surrounding stroma. Most of the available breast cancer lines issued from metastatic tumors, mainly from a pleural effusion. Effusions provided generally large numbers of dissociated, viable tumor cells with little or no contamination by fibroblasts and other tumor stroma cells. Many of the currently used BCC lines were established in the late 1970's. a very few of them, namely MCF-7, T-47D, and MDA-MB-231, account for more than two-thirds of all abstracts reporting studies on mentioned breast cancer cell lines, as concluded from a Medline-based survey.

## Molecular markers

**Transcription Factors:** NFTA transcription factors are implicated in breast cancer, more specifically in the process of cell motility at the basis of metastasis formation. Indeed, NFAT1 (NFATC2) and NFAT5 are pro invasive and promigratory in breast carcinoma and NFAT3 (NFATC4) is an inhibitor of cell motility. NFAT1 regulates the expression of the TWEAKR and its ligand TWEAK with the Lipocalin 2 to increase breast cancer cell invasion and NFAT3 inhibits Lipocalin 2 expression to blunt the cell invasion.

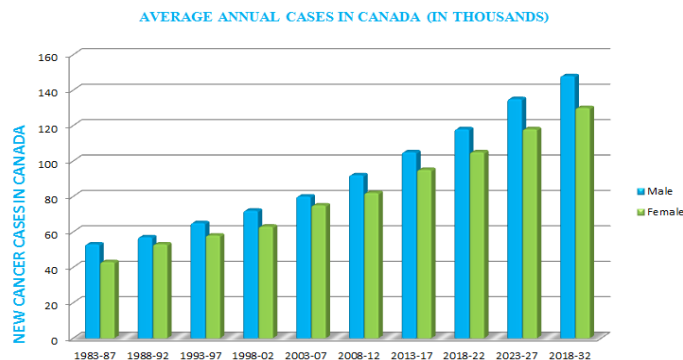
## Metabolic markers

Clinically, the most useful metabolic markers in breast cancer are the estrogen and progesterone receptors that are used to predict response to hormone therapy. New or potentially new markers for breast cancer include BRCA1 and BRCA2 to identify patients at high risk of developing breast cancer, HER2 and SCD1 for predicting response to therapeutic regimens and urokinase plasminogen activator, PA1-1 and SCD1 for assessing prognosis.

## Survey Report

Breast cancer is the second leading cancer in women worldwide, with nearly 1.7 million new cases diagnosed in 2012. Breast cancer is most common after menopause. American Cancer Society, for the

year 2016 estimates that about 252,710 new cases of invasive breast cancer will be diagnosed in women, about 63,410 new cases of carcinoma in situ (CIS) will be diagnosed and about 40,601 women will die from breast cancer.



## Trends in breast cancer incidence

Incidence rates vary from 19.3 per 100 000 women in Eastern Africa to 89.9 per 100 000 women in Western Europe and are high in developed regions of the world (more than 80 per 100 000) except Japan and low in most of the developing regions (less than 40 per 100 000). Although developed countries have high incidence rates, in the transition countries like Latin America, it is going to be increased in the future. The rates vary worldwide, with Europe being the highest. The rates are increasing in Latin America and Asian countries mainly due to the population aging and screening practices.

The total number of cases registered for five year period 1998-2002 were 13 120 964 (6 848 973 men and 6 271 991 women), the average of annual cases registered to be about 1 250 000 for women and 1 369 795 for men. During this period, 1 775 353 cases of breast cancer were registered worldwide. The highest rates occurred in Europe (Belgium, France, Switzerland, Italy) and in Australia with average rates of 60-100/100 000 cases. The lowest ASR (W) was between 18-30/100 000 in India, Thailand, China and Africa (Harare and Kyadondo).

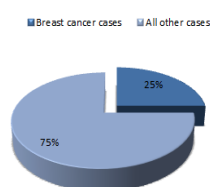
## Canada Breast Cancer Statistics

26,300 women were diagnosed with breast cancer. This represents 25% of all new cancer cases in women in 2017. 5,000 women died from breast cancer. This represents 13% of all cancer deaths in women in 2017.

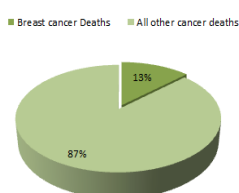
On average, 72 Canadian women were diagnosed with breast cancer every day. On average, 14 Canadian women died from breast cancer every day. 230 men were diagnosed with breast cancer and 60 died from breast cancer.

About 12% of Canadian women (1 in 8) will develop breast cancer over the course of her lifetime. In 2017, an estimated 266,110 new cases of invasive and 63,960 new cases of non-invasive (in situ) breast cancer are expected to be diagnosed.

**Breast cancer cases statistics 2017**

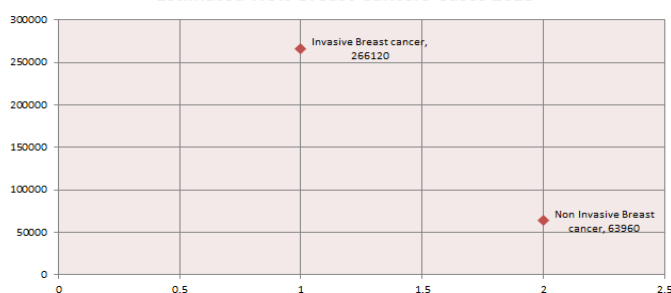


**Breast cancer Deaths Statistics 2017**



After increasing incidence rates of breast cancer for the previous two decades, it began decreasing in the year 2000 and dropped by 7% from 2002 to 2003 alone. This decrease was partially due to the reduced use of hormone replacement therapy (HRT) by women after results of a large study called Women's Health Initiative which was published in the year 2002. These results suggested a relation between HRT and increased breast cancer risk.

**Estimated New Breast Cancers Cases 2018**



Though death rates have been decreased since 1989, about 40,610 women are expected to die in the year

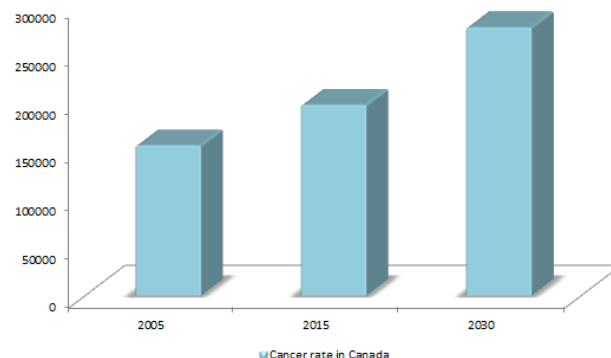
2017 in the U.S. from breast cancer. Women under the

age of 50 have experienced larger decreases. These decreases are thought to be the result of treatment advances, earlier detection through screening and increased awareness.

Besides skin cancer, breast cancer is the most commonly diagnosed cancer among American women. In 2017, it is estimated that about 30% of new cases diagnosed in women will be breast cancers.

Breast cancer is more common in African-American women than in white women under the age 45. Overall, African-American women are more likely to die of breast cancer. For Asian, Hispanic and Native-American women, the risk of developing and dying from breast cancer is lower. As many as 40 % cases more cases are predicted by 2030.

**CANCER RATE IN CANADA**



The risk of breast cancer in women doubles, if she has a first-degree relative (mother, sister or daughter) who has been diagnosed with breast cancer. Less than 15% of women who get breast cancer have a family member diagnosed with it.

About 5-10% of breast cancer is linked to gene mutations (abnormal changes) inherited from one's mother or father. Mutations of BRCA1 and BRCA2 genes are the most common ones. On an average, women with the BRCA1 mutation have a 55-65% lifetime risk of developing breast cancer. The risk is 45% for the women with the BRCA2 mutation. Breast cancer that is positive for the BRCA1 and BRCA2 mutations tends to develop more often in younger women. An increased ovarian cancer risk is also associated with these genetic mutations. In men, BRCA2 mutations are associated with a lifetime breast cancer risk of about 6.8%, BRCA1



mutations are a less frequent cause of breast cancer in men.

## The objective behind the Conference

The main objective of holding Breast Pathology and Cancer Diagnosis 2019 conference is to share the latest research and developments of individuals in the sphere of cancer, which helps to develop new techniques for the treatment and can also discuss and plan to reduce the use of chemotherapy treatment by introducing special drugs that will continue to develop and directly attack special targeted breast cancer cells.

## Pharmaceutical Companies Leading the Breast Cancer Fight

- Bristol-Myers Squibb Co. (NYSE: BMY)
- Merck & Co. Inc. (NYSE: MRK)
- Medivation Inc. (NASDAQ: MDVN)
- Pfizer Inc. (NYSE: PFE)

## Breast Cancer Associations & Societies around the Globe

1. American Cancer Society
2. American Medical Women's Association
3. American Society for Radiation Oncology

4. American Society of Paediatric Hematology/Oncology
5. Association of Cancer Physicians
6. Association of Chartered Physiotherapists in Women's Health
7. Association of Women's Health, Obstetric and Neonatal Nurses
8. Breast Screen Australia Program
9. Cancer Relief Society Nepal
10. Cancer Society of Finland
11. Cancer Society of New Zealand
12. Caribbean Women's Health Association
13. European Association for Cancer Research (EACR)
14. Indonesian Society of Gynecologic Oncology
15. International Association for Women's Mental Health
16. International Gynecologic Cancer Society
17. Iranian Society of Radiation Oncology
18. Japanese Breast Cancer Society
19. New Zealand Breast Cancer Foundation (NZBCF)
20. Society for Women's Health Research
21. Spanish Association for Cancer Research (CMA)
22. Thai Gynecologic Cancer Society