Why does breast or ovarian cancer occur?

Sometimes you may wonder why breast or ovarian cancer occurs, especially if you or a family member has been diagnosed with the disease. It is important to remember that most cases of breast or ovarian cancer do not have a known cause. However, there are some factors that may increase your risk of developing breast or ovarian cancer. These factors can be divided into two main categories: genetic and environmental.

1. Genetic Factors
   - Inherited genetic mutations: Some women are born with a genetic mutation that increases their risk of developing breast or ovarian cancer. This is known as hereditary breast and ovarian cancer syndrome (BRCA1, BRCA2). These genes are responsible for repairing DNA and when they are mutated, they fail to repair DNA correctly, leading to cell growth and development of cancer.
   - Familial history: A family history of breast or ovarian cancer can also increase your risk. If a close family member has been diagnosed with breast or ovarian cancer, your risk is higher.

2. Environmental Factors
   - Hormones: Hormones play a significant role in breast and ovarian cancer development. Estrogen and progesterone levels can increase the risk of developing these cancers.
   - Lifestyle factors: Factors such as obesity, smoking, alcohol consumption, and lack of physical activity can also increase the risk of developing breast and ovarian cancer.
   - Other factors: Exposure to certain chemicals, radiation, and some infections can also contribute to the development of breast and ovarian cancer.

Understanding these factors can help in identifying high-risk groups and implementing strategies to reduce the risk of developing breast and ovarian cancer.

Early detection - what women can do

Cancer Australia works to reduce the impact of cancer and improve the wellbeing of people affected by cancer in Australia.

Advice about familial aspects of breast cancer and epithelial ovarian cancer

A guide for health professionals

DECEMBER 2020

This guide has been developed to cover familial aspects of both breast and epithelial ovarian cancer. It is designed to provide information to health professionals to assist them in providing appropriate care to women with a family history of breast or ovarian cancer.

Cancer Australia and the Australian Government have provided information about the potential of high-risk breast and ovarian cancer in women with a family history.

1. Family History of Breast or Ovarian Cancer
   - A family history of breast or ovarian cancer increases the risk of developing these cancers in women. Women with a family history of breast or ovarian cancer are more likely to be diagnosed at a younger age and have a higher risk of developing both cancers.

2. Genetic Testing
   - Genetic testing can help identify women who are at increased risk of developing breast or ovarian cancer due to a genetic mutation. Genetic testing is usually recommended for women with a strong family history of breast or ovarian cancer.

3. Risk Assessment and Management
   - Women with a family history of breast or ovarian cancer should consult with a health professional to assess their risk of developing these cancers. Management options may include regular screening, risk reduction strategies, and genetic counseling.

4. Support and Resources
   - Women with a family history of breast or ovarian cancer should be provided with access to support and resources to help them manage the emotional and psychological impact of their diagnosis.

This guide is intended to assist health professionals in providing appropriate care to women with a family history of breast or ovarian cancer. It is not a substitute for medical advice and individual circumstances should be considered.
Assessing family history

Family history

A family history of breast or ovarian cancer can be used to estimate a woman’s risk of developing these cancers.

Key factors associated with increased risk include:

- multiple relatives having breast or ovarian cancer
- relatives having breast cancer at an early age
- relatives having ovarian cancer

Inferring cancer risk from a family history

Taking a family history

Consider visit each as part of the family assessment.

- asking the woman about personal history of all cancers, including breast and ovarian cancer.
- asking her family about their medical history and cancer diagnoses.
- assessing reproductive history and cancer risk of offspring.

Table 1: Family history of breast or ovarian cancer

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
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<tr>
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<td>More than 1 relative with breast or ovarian cancer (first or second degree, same or opposite sex)</td>
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<td>High risk</td>
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CANCERGENETIC TESTING

Genetic testing may be available in some women with cancer predisposition genes.

Some mutations may not be detected using current technology.

New technologies are being developed and may offer better predictive accuracy in the future.

Choosing to undergo genetic testing

Testing may then be offered to other adult relatives who may carry the same mutation as the woman tested.

Some mutations may not be detected using current technology.

Advise that there is a moderately increased risk of developing breast cancer.

Inform that breast cancer risk increases with age (see Table 1).

Reassure that 9 out of 10 women in this group will not develop breast cancer.


In women over 35 years of age, consider the use of medication, such as tamoxifen or raloxifene, to reduce risk of developing breast cancer.

Annual mammograms are not recommended for women with a single relative diagnosed >50 years, as there is no clear evidence of benefit.

Referral to a family cancer clinic may be appropriate.

The following categorisation applies to women without breast or ovarian cancer:

CATEGORIES OF RISK

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Referral to a family cancer clinic may be appropriate.
On 30 June 2011, National Breast and Ovarian Cancer Centre (NBOCC) amalgamated with Cancer Australia to form a single organisation, Cancer Australia, to provide leadership in cancer control and improve outcomes for Australians affected by cancer.

There may be other genes, as yet undiscovered, in which mutations are associated with breast or ovarian cancer. Family history of breast or ovarian cancer can be used to estimate:

1. At or slightly above average risk  OR  2. Moderately increased risk

Table 1: For women with familial risk – see Table 2 for risk assessments of other female relatives

Table 2: For those on whom genetic testing is available – see an appointment for a genetic counseling and possibly cancer at other sites.

Advice about familial aspects of ovarian cancer

Table 2: For women for which options are limited to be offered an appointment to discuss your options – see a referral to a family cancer centre or specialist cancer clinic.

Advice about familial aspects of breast cancer

Table 1: For women of Ashkenazi Jewish ancestry – see Table 2 for risk assessments of other female relatives

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Advice about familial aspects of breast cancer

Table 1: For women of Ashkenazi Jewish ancestry – see Table 2 for risk assessments of other female relatives

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Advice about familial aspects of breast cancer
**On 30 June 2011, National Breast and Ovarian Cancer Centre (NBOCC) amalgamated with Cancer Australia to form a single ... leadership in cancer control and improve outcomes for Australians affected by cancer.**

**Women born with a mutation in one of several known genes predisposition to breast or ovarian cancer?**

Which genes are associated with a predisposition to breast or ovarian cancer?

When should women get a genetic test for breast or ovarian cancer predisposition?

**Key factors associated with increased risk include:**

- Family history of breast or ovarian cancer can be used to estimate:
  - Her risk in the next 10 years
  - Her risk in the next 20 years
  - Her risk at 30 years old
  - Her risk at 40 years old

- Additional features of the p53 tumour suppressor gene are associated with an increased risk of breast cancer.

- The presence of a mismatch repair gene mutation increases the risk of both breast and ovarian cancer.

- Women with Lynch Syndrome (HNPCC) are at increased risk of both breast and ovarian cancer.

- The presence of a mutation in a known breast or ovarian cancer-predisposing gene.

- Hereditary non-polyposis colorectal cancer (HNPCC) is also known as hereditary non-polyposis colorectal cancer.

**Risk to age 75 in mutation carriers**

<table>
<thead>
<tr>
<th>Gene</th>
<th>Risk to age 75 (%)</th>
<th>Risk to age 75 in 1 in 1000 women (cases per 1000)</th>
</tr>
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<tbody>
<tr>
<td>BRCA1</td>
<td>60 - 80</td>
<td>1 in 1000</td>
</tr>
<tr>
<td>BRCA2</td>
<td>40 - 60</td>
<td>1 in 1000</td>
</tr>
<tr>
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<td>1 in 1000</td>
</tr>
<tr>
<td>ATM</td>
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**Risk factors for breast and ovarian cancer**

<table>
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<tr>
<th>Risk factors for breast and ovarian cancer</th>
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<tbody>
<tr>
<td>Smoking</td>
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</tr>
<tr>
<td>Family history</td>
<td>Assess family history</td>
</tr>
<tr>
<td>Age</td>
<td>Regular clinical breast examination</td>
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**CANCER PREVENTION**

- **Screening and early detection:**
  - Breast cancer: mammogram, clinical breast examination, breast MRI
  - Ovarian cancer: pelvic examination, transvaginal ultrasound

- **Risk reduction strategies:**
  - Genetic testing
  - Chemoprevention
  - Diet and lifestyle changes
  - Radiation therapy
  - Surgery

- **Cancer control and treatment:**
  - Surgery
  - Chemotherapy
  - Radiation therapy
  - Clinical trials

**Further information:**


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**Table 2:** For which reasons are women to be offered an additional predisposition to breast or ovarian cancer and possibly other causes as well?

<table>
<thead>
<tr>
<th>Reason</th>
<th>Possible outcomes</th>
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<tbody>
<tr>
<td>Hereditary aspects of breast cancer</td>
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**Table 3:** The following categorisation applies to women without breast or ovarian cancer:

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<td>Risk factors for breast and ovarian cancer are not notably increased. Possible outcomes include breast cancer, ovarian cancer, and other causes.</td>
</tr>
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<td>2. Moderately increased risk</td>
<td>Risk factors for breast and ovarian cancer are significantly increased. Possible outcomes include breast cancer, ovarian cancer, and other causes.</td>
</tr>
<tr>
<td>3. Potentially high risk</td>
<td>Risk factors for breast and ovarian cancer are highly increased. Possible outcomes include breast cancer, ovarian cancer, and other causes.</td>
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**Risk to age 75 in mutation carriers**

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**Further information:**


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**CANCER PREVENTION**

- **Screening and early detection:**
  - Ovarian cancer: pelvic examination, transvaginal ultrasound
  - Breast cancer: mammogram, clinical breast examination, breast MRI

- **Risk reduction strategies:**
  - Genetic testing
  - Chemoprevention
  - Diet and lifestyle changes
  - Radiation therapy
  - Surgery

- **Cancer control and treatment:**
  - Surgery
  - Chemotherapy
  - Radiation therapy
  - Clinical trials

**Further information:**

Why does breast or ovarian cancer occur?

Sometimes we hear that people are born with cancer. This is not true. Cancer is not inherited. But some women are more likely than others to develop breast or ovarian cancer. The risk of developing breast cancer increases with age. About one in eight women will develop breast cancer before the age of 85. About one in 81 women will develop ovarian cancer before the age of 85. The risk of developing breast or ovarian cancer increases with age.

A family history of breast or ovarian cancer means having one or more blood relatives who have, or have had, breast or ovarian cancer. These are genes which normally prevent a woman developing breast or ovarian cancer. Inheriting a breast or ovarian cancer gene fault increases a woman's chance of developing breast or ovarian cancer. These are genes which normally prevent a woman developing breast or ovarian cancer. Some of these are genes that you may have heard of are called BRCA1 and BRCA2. Their names come from the abbreviation of “breast cancer one” and “breast cancer two”. If a woman has inherited a fault in one of these genes, her risk of developing breast or ovarian cancer is increased. Two or more close relatives on the same side of the family with breast or ovarian cancer (or Lynch Syndrome) is also an indication that a woman may have inherited a breast or ovarian cancer gene fault. In some families genetic testing can be used to assess risk. The availability, limitations, potential benefits, and possible consequences of genetic testing depend on the family history and current health status of the woman and the results of the genetic testing.

For key statistics about breast and ovarian cancer see canceraustralia.gov.au.

What is the “risk factors” for breast and ovarian cancer?

There are many things, called risk factors, which can increase or decrease a woman’s chance of developing breast or ovarian cancer. Smoking history, increasing age, and family history are the main risk factors.

What is meant by a family history of breast or ovarian cancer?

A family history of breast or ovarian cancer means having one or more blood relatives who have, or have had, breast or ovarian cancer. These are genes which normally prevent a woman developing breast or ovarian cancer. Some of these are genes that you may have heard of are called BRCA1 and BRCA2. Their names come from the abbreviation of “breast cancer one” and “breast cancer two”. If a woman has inherited a fault in one of these genes, her risk of developing breast or ovarian cancer is increased.

Inheriting a breast or ovarian cancer gene fault increases a woman's chance of developing breast or ovarian cancer. In some families genetic testing can be used to assess risk. The availability, limitations, potential benefits, and possible consequences of genetic testing depend on the family history and current health status of the woman and the results of the genetic testing.

What is a woman’s chance of developing breast or ovarian cancer?

Breast or ovarian cancer caused by inheriting a faulty gene is called hereditary cancer. We all inherit a set of genes from each of our parents. These genes are inherited randomly. Sometimes these genes don’t work properly. This fault is called a mutation. There are several genes which are important in preventing breast or ovarian cancer. In hereditary cancer, we refer to the age at which the cancer was diagnosed, whether the cancer was in one or both breasts, and whether the cancer was in one or both ovaries.

Inheriting a breast or ovarian cancer gene fault increases a woman’s chance of developing breast or ovarian cancer. In some families genetic testing can be used to assess risk. The availability, limitations, potential benefits, and possible consequences of genetic testing depend on the family history and current health status of the woman and the results of the genetic testing.
All women have a chance of developing breast or ovarian cancer at some time during their lives. The risk of developing either cancer increases with age.

**Inherited cancer**

Inheriting a breast or ovarian cancer gene fault increases with age. This occurs more often in older women. The reasons for this are not yet fully understood.

**What is a woman’s chance of developing breast or ovarian cancer?**

All women have a chance of developing breast or ovarian cancer at some time during their lives. The risk of developing either cancer increases with age.

About one in 81 women will develop ovarian cancer before the age of 85. About one in 8 women will develop breast cancer before the age of 85.

**Early detection - what women can do**

1. Three or more close blood relatives on the same side of the family with breast or ovarian cancer, in the same or different cancers, plus one or more additional relatives with breast or ovarian cancer.

OR

2. Three or more close relatives (on the same side of the family) with colorectal cancer, in the same or different cancers, plus one or more additional relatives with colorectal cancer (or any combination colorectal/breast/ovarian).

OR

3. A woman who has had a genetic test and has been advised that she is at a high risk.

A woman could be at potentially high risk of developing either breast or ovarian cancer if she:

- has inherited a faulty gene which increases the risk of breast or ovarian cancer.
- is one of the small group of women who have inherited a gene fault that causes breast and ovarian cancer, called the “BRCAs”.

**What is a family history of breast or ovarian cancer?**

A family history of breast or ovarian cancer means having one or more blood relatives who have, or have had, breast or ovarian cancer. These are genes which normally prevent a woman from developing breast or ovarian cancer. In some cases it is not possible to determine which member of the family has inherited the faulty gene.

**What is the “risk factors” for breast and ovarian cancer?**

There are many things, called risk factors, which can increase a woman’s chance of developing breast or ovarian cancer. Risk factors include:

- Being female
- Increasing age
- Family history

Increasing age

The older a woman is the more likely she is to develop breast or ovarian cancer. The risk increases with age.

**How does breast or ovarian cancer occur?**

Breast and ovarian cancer are caused by changes to genes. These changes can cause the cells to grow out of control, leading to the development of cancer.

**What is a woman’s chance of developing breast or ovarian cancer?**

Most women who develop breast or ovarian cancer are over the age of 85. About one in 81 women will develop ovarian cancer before the age of 85. About one in 8 women will develop breast cancer before the age of 85.

**Why does breast or ovarian cancer occur?**

Being female, increasing age and family history are the main risk factors. There are many things, called risk factors, which can increase a woman’s chance of developing breast or ovarian cancer. The earlier that cancer is found the more successful the outcome.

**Inheriting a breast or ovarian cancer gene fault**

Breast or ovarian cancer can be inherited by a woman if she has a family history of breast cancer. The reason for this is that there are genes which normally prevent a woman from developing breast or ovarian cancer. In some cases it is not possible to determine which member of the family has inherited the faulty gene.

**What can be done about familial aspects of breast and ovarian cancer?**

In addition, for women with a family history:

Advice about familial aspects of breast cancer and epithelial ovarian cancer

A guide for health professionals

This guide has three parts:

1. Information for health professionals
2. Tables which describe risk based on family history and current, supported management
3. Information for consumers that may be photocopied for distribution.

This guide has been developed to cover familial aspects of both breast and epithelial ovarian cancer. *This guide is general for appropriate practice to be followed by the health professional’s judgement on what is best for the individual. It is designed to provide information for health professionals and their patients. The guide is based on the best available evidence or consensus of experts when evidence does not exist at the date of publication.*

The information on page two can be used to determine an unaffected woman’s risk of developing breast or ovarian cancer. This information includes familial aspects. Further family history information on page three can usually be used to determine her risk of developing ovarian cancer.

To estimate the risk of a woman developing breast or ovarian cancer, based on family history, with additional familial history scenarios not covered in this guide, visit the Familial Risk Assessment – Breast and Ovarian Cancer (FRA-BOC) on-line at canceraustralia.gov.au/fraboc.

In some families genetic testing can be used to assess risk. The availability, limitations, potential benefits and possible consequences of genetic testing can be discussed at a family cancer clinic.

* Note: History of these cancers may not be apparent in the family tree but are managed as epithelial ovarian cancer.