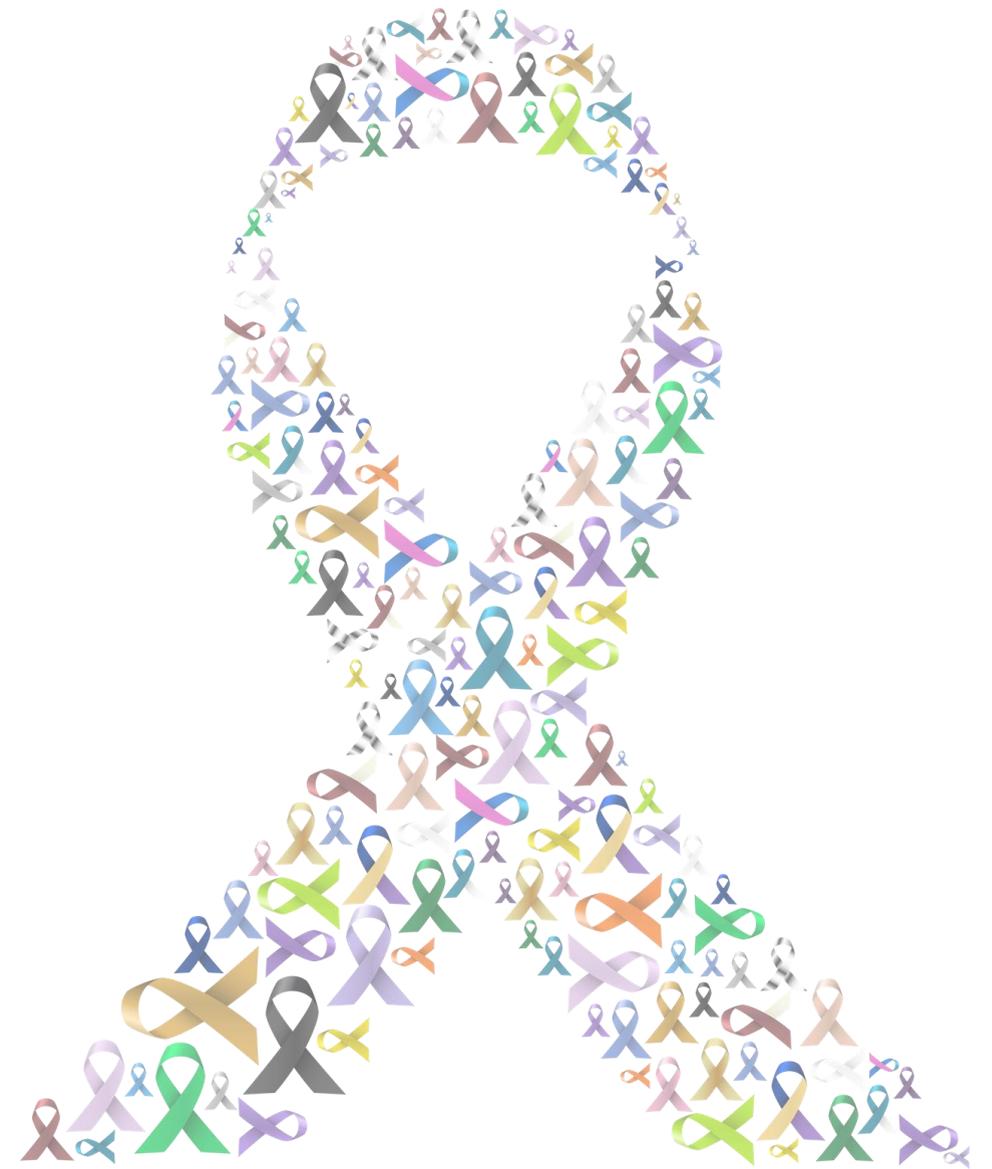


Understanding BRCA and What this Means for You

A Guide to BRCA 1/2 and Hereditary Breast
and Ovarian Cancer

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Disclaimer

- The goal of this presentation is to serve as a guide regarding the current landscape of BRCA1/2 and the risk management options available.
- The presentation is not meant to offer medical advice and is not intended to replace your medical care through your health care team.

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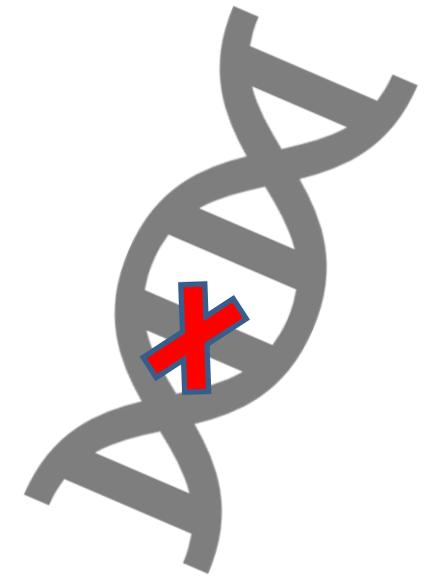
Goals

- To review BRCA and the associated cancer risks
- To discuss current guidelines for cancer risk management
- To support you in sharing your genetic test results with your family
- To address frequently asked questions

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BRCA 101

- BRCA1 and BRCA2 gene mutations do NOT cause cancer
- BRCA gene mutations may prevent your cell's ability to repair DNA damage
- It is the build up of DNA damage that can change a normal cell into a cancerous cell
- Having a BRCA mutation means that you are at increased risk of developing certain types of cancer.



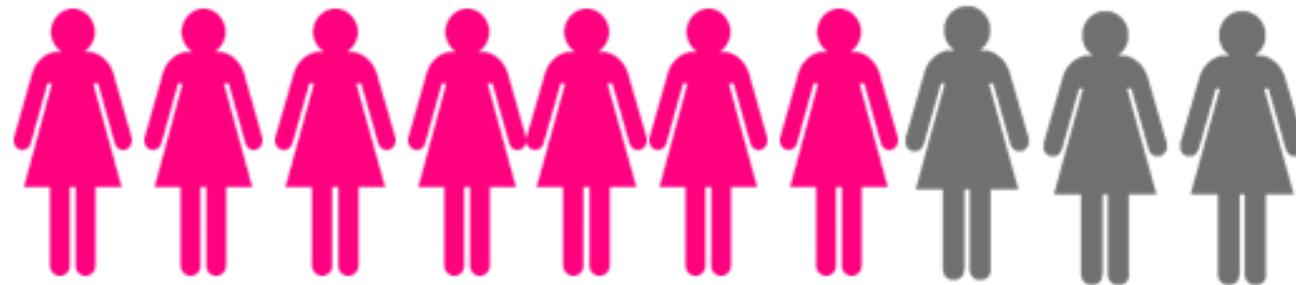
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What are the cancer risks associated with BRCA 1/2?

Lifetime Breast Cancer Risks:



No mutation
1 out of 8 (12%)



BRCA mutation
Up to 70%

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What are the cancer risks associated with BRCA 1/2?

Lifetime Ovarian Cancer Risks:



No mutation
1 out of 70 (1.4%)



BRCA1 mutation
Up to 40%

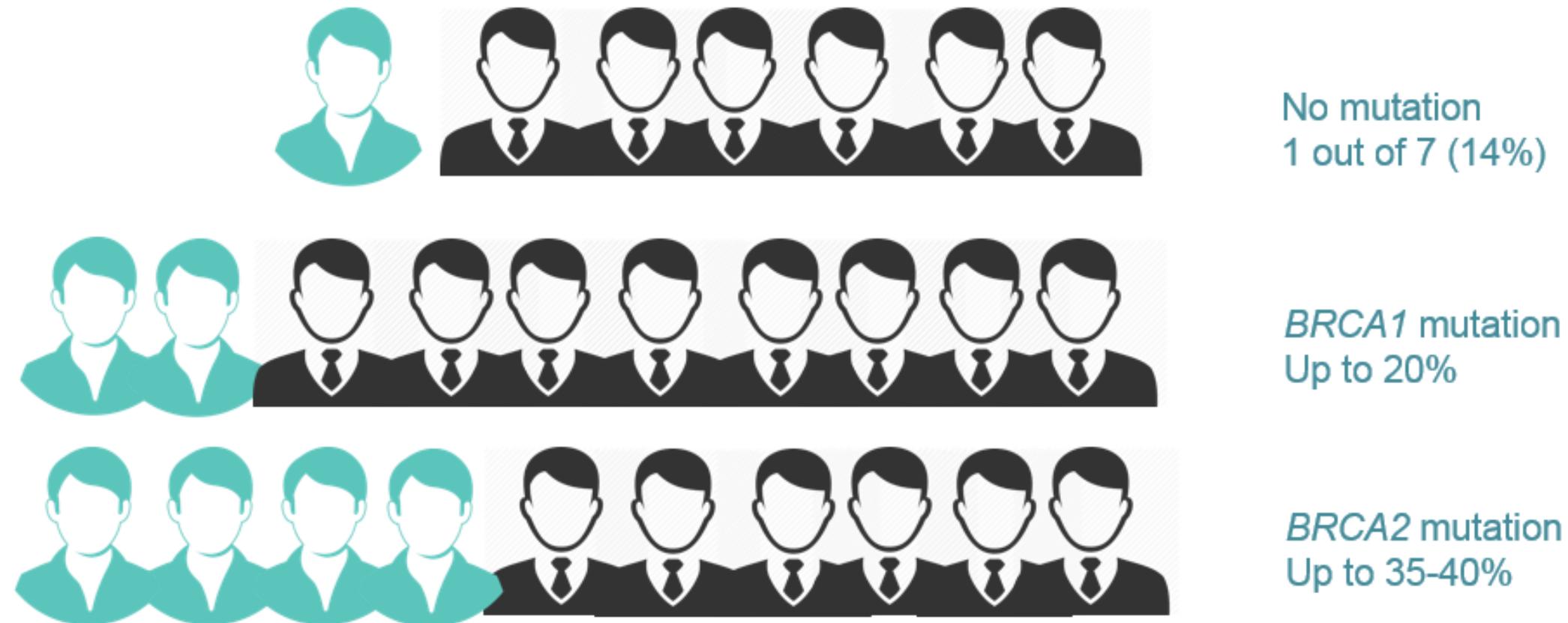


BRCA2 mutation
Up to 20%

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What are the cancer risks associated with BRCA 1/2?

Lifetime Prostate Cancer Risks:



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What are the cancer risks associated with BRCA 1/2?

Additional Lifetime Cancer Risks Associated with BRCA2 mutations:

	General Population Risk	BRCA2 Mutation carrier
Male Breast cancer	1 out of 1000 (0.1%)	Up to 6%
Pancreatic cancer	1 out of 79 (1.2%)	4-8%
Melanoma	1 out of 56 (Men) 1 out of 74 (women) (1.4 – 1.8%)	Elevated
Gastrointestinal cancers (including colorectal and gastric cancers)	1 out of 13 (Men) 1 out of 16 (Women) (6-8%)	Elevated

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Risk management options: current guidelines for breast cancer

Breast screening:

Age 25



- Clinical breast exams (every 6-12m)
- *Consideration of breast imaging (dependent on personal and family history)*
- Referral to High-Risk Breast Clinic

Age 30 to 69



- Breast MRI and mammogram (every 12m) through the high risk breast screening program of OBSP
- Clinical breast exam every 6-12m

Age 70



- Breast imaging should be considered on an individual basis
- *(typically annual mammogram)*

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Risk management options: current guidelines for breast cancer

Risk-reducing (prophylactic) mastectomy

- Can reduce breast cancer risk by up to 95%
- Typically may be performed in conjunction with reconstruction (covered by OHIP)
- Personal decision
- Speak with your breast specialist, peers, attend educational events (i.e. 'Reconstruction Workshop' at WCH or BRA Day)

Chemoprevention

- SERM (e.g. Tamoxifen, Aromatase inhibitor)
- Can reduce breast cancer risk (particularly ER+) by up to 50%
- Consideration of side effects

Risk-reducing bilateral salpingo-oophorectomy

- May reduce breast cancer risk (specifically, in BRCA2 gene mutation carriers)

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Risk management options: current guidelines for ovarian cancer

Risk-reducing bilateral salpingo-oophorectomy (BSO)

- Removal of the ovaries and fallopian tubes to reduce one's risk of developing cancer.
 - Reduces the risk of cancer by up to 90%
 - There remains a 1-5% chance of developing a peritoneal cancer
- Consider BSO between **ages 35 and 40** or after having your family, particularly for **BRCA1** carriers.
 - It is reasonable to delay BSO to **age 40-45** for **BRCA2** gene mutation carriers
 - Important to understand the impact of having a BSO

NOTE: Ovarian cancer screening (i.e. Transvaginal ultrasound and CA-125) is not proven to detect cancers early and is therefore not recommended at this time.

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Risk management options: current guidelines for ovarian cancer

What about removing just the fallopian tubes (i.e. Having a salpingectomy)?

- The preventative removal of the fallopian tubes only as a risk reducing surgery for ovarian cancer is not standard of care and women are still at risk for developing ovarian cancer
- There is not enough data to indicate that this type of surgery will reduce your risk of developing ovarian and fallopian tube cancers or reduce your breast cancer risk
- Please speak with your gynecologist or gynecological oncologist if you would like additional information

NOTE: Overall, having a salpingectomy does not replace having a BSO as a risk reducing surgery for BRCA carriers.

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Risk management options: current guidelines for ovarian cancer

Chemoprevention

- Taking oral contraceptives (i.e. Birth control pill) has been shown to decrease the lifetime risk of ovarian cancer by up to 40%
- Duration will impact risk reduction (maximal benefit was seen when women took birth control pills for at least 5 consecutive years)
- There is limited data on other forms of birth control and the impact on ovarian cancer risk reduction

NOTE: Taking oral contraceptive may increase breast cancer risk. However, use prior to age 20 may be considered. Discuss with your health care provider.

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Risk management options: current guidelines for male carriers

Cancer screening includes:

Prostate cancer

- PSA and digital rectal exam starting at age
- Referral to the Familial Prostate Cancer Clinic and MORE Program

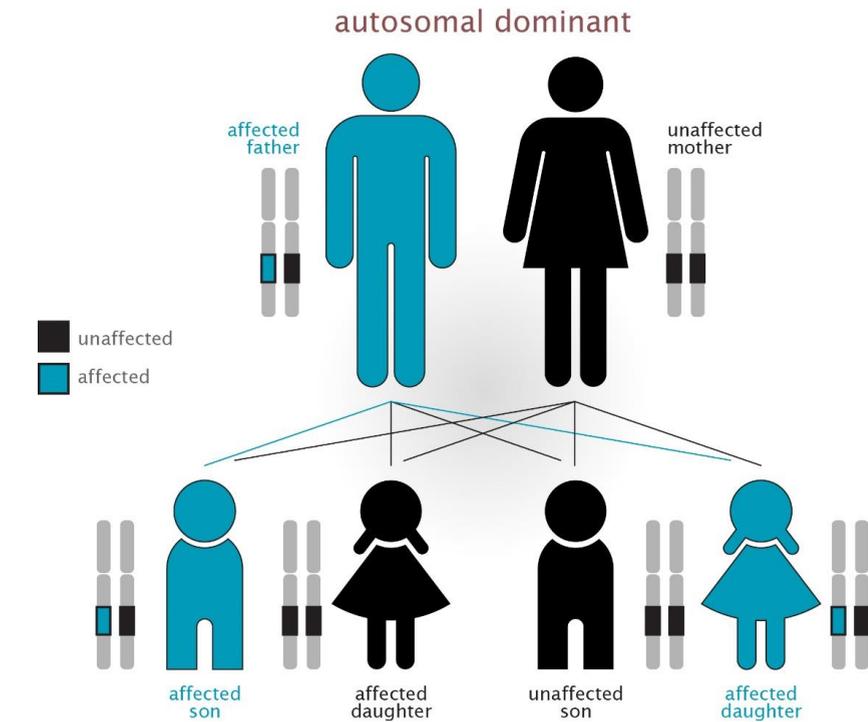
Breast cancer

- Breast awareness and clinical chest exam every 12 months

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Sharing the information with your family: who needs to know?

- Your close family members (i.e. Brothers/sisters, parents and children) are each at 50% risk of having the familial BRCA mutation
- Men and women have the same chance to inherit a BRCA mutation
- Genetic testing does not tell us which side of the family the BRCA gene mutation is coming from
- Genetic testing is the only way to identify whether someone has the familial BRCA gene mutation
- It is helpful to let extended family (i.e. cousins, aunts/uncles) know about the mutation, as well



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Sharing the information with your family: who needs to know?

- You are the expert when it comes to your family
- Your views and your family's views may not align
- Not everyone's reactions will be the same
- You are not alone (see resource section)
- Consider attending our workshop: "BRCA and your family"

REMEMBER: All you can do is share the information and that way each of your family members can make their own decision when it comes to genetic testing.

Understanding who is at risk may be the easy part...

**A big question is ...
"HOW do I tell my family?"**

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Frequently asked questions

Q. Family planning & fertility: what does this mean for my children or future pregnancies?

- With every child or pregnancy there is a 50% chance of passing on the BRCA mutation
- Boys and girls are just as likely to inherit the BRCA mutation

Fertility:

- Our research shows that there is no association between BRCA mutations and infertility
- For future pregnancies, couples may consider preimplantation genetic diagnosis (PGD), which may allow them to have a child without the BRCA mutation (at a cost)
- You can speak with your genetic counsellor or family doctor to get more information or be referred to a local fertility clinic

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IMPORTANT: The topic of fertility is different for women with a history of breast CA

Frequently asked questions

Q. When should my children have genetic testing?

- Women and men may pursue genetic testing when they are 18 years of age or older
- Currently we recommend genetic counselling and testing around age 25 for women

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Frequently asked questions

Q. What if one of my family members tests negative for the mutation?

- Typically, when an individual tests negative (ie. Predictive negative) for the familial mutation they are considered at **general population risk** for BRCA-associated cancers.
- It is important to remember that testing negative does not mean the cancer risks are zero, therefore your family members should speak with their family doctor about the appropriate cancer screening.
- It is still important for individuals to consider and discuss other personal or familial risk factors with their health care providers.

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Frequently asked questions

Q. If I have a BSO, can I take hormone replacement therapy (HRT)?

- This depends on whether you have a personal history of breast cancer or not.

Personal Cancer history

- Women are not recommended to use HRT
- Additional options (other than HRT) may be available to manage their symptoms after having a BSO

No Personal Cancer history

- Women should consider the use of HRT
- HRT has been shown to increase overall quality of life, menopause-specific quality of life and vasomotor symptoms (i.e. hot flashes)
- HRT does not significantly increase the risk of postmenopausal breast cancer in carriers who have had early surgical

NOTE: Speak with your gynecologist regarding the best options for you.

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Frequently asked questions

Q. If I elect to have a BSO, do I need to remove my uterus (i.e. have a hysterectomy)?

- Having a hysterectomy is not standard of care and not required for BRCA carriers
- Current research does not suggest a link between the BRCA genes and an increased risk for uterine cancer
- Women may consider having a hysterectomy in certain circumstances (e.g. Personal or familial risk factors, having previous uterine abnormalities, consideration of HRT use and type of HRT)
- Speak with your gynecologist as the decision to have a hysterectomy must be individualized – every patient is unique!

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Frequently asked questions

Q. If someone does not wish to have genetic testing, can they still have high risk screening?

- YES! Women who are at 50% risk of having a BRCA mutation may be followed as part of the high risk breast screening program of OBSP (including breast MRI and mammogram).
- YES! Men who are at risk of having a familial BRCA mutation may choose to have prostate cancer screening starting at age 40.

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Frequently asked questions

Q. Is there a benefit for the men in my family to pursue genetic testing?

- Men are just as likely to inherit and pass down a BRCA mutation as the women in the family
- Men who carry a BRCA1 and BRCA2 gene mutation are at increased risk of developing prostate cancer, which can be more aggressive and can occur at a younger age
 - Early detection is key
 - Familial Prostate Cancer Clinic and MORE research program **are available** at Sunnybrook Cancer Centre
- Male BRCA2 carriers are also at risk for other cancers, including male breast cancer and colorectal cancer

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Frequently asked questions

Q. Are there any BRCA-specific cancer treatments?

- **Breast cancer:** use of platinum-based chemotherapy in BRCA-positive individuals or qualify for additional clinical trials
- **Ovarian cancer:** individuals may benefit from new treatments known as PARP inhibitors or qualify for additional clinical trials
- **Pancreatic cancer:** use of platinum-based chemotherapy in BRCA-positive individuals or qualify for additional clinical trials
- **Prostate cancer:** BRCA-positive men may be offered more extensive treatment sooner than non-carriers or may qualify for clinical trials (i.e. PARP inhibitor trials)

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Frequently asked questions

Q. Is there anything else I can do to reduce my risk, like take supplements or eat certain foods?

Exercise:

- Regular exercise provides many health benefits and may also reduce cancer risks
- Studies have shown that early-life exercise, as well as regular exercise may reduce breast cancer risk in high risk women (Schmitz KH et al. 2015; Lammert et al. 2018)

Diet & lifestyle:

- Consumption of low-calorie food rich in greens, fruits and vegetables
- Not smoking or drinking alcohol to excess
- Maintaining an ideal weight for your age

NOTE: Lifestyle changes are important, but they do not replace risk-reducing strategies in terms of cancer reduction.

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Frequently asked questions

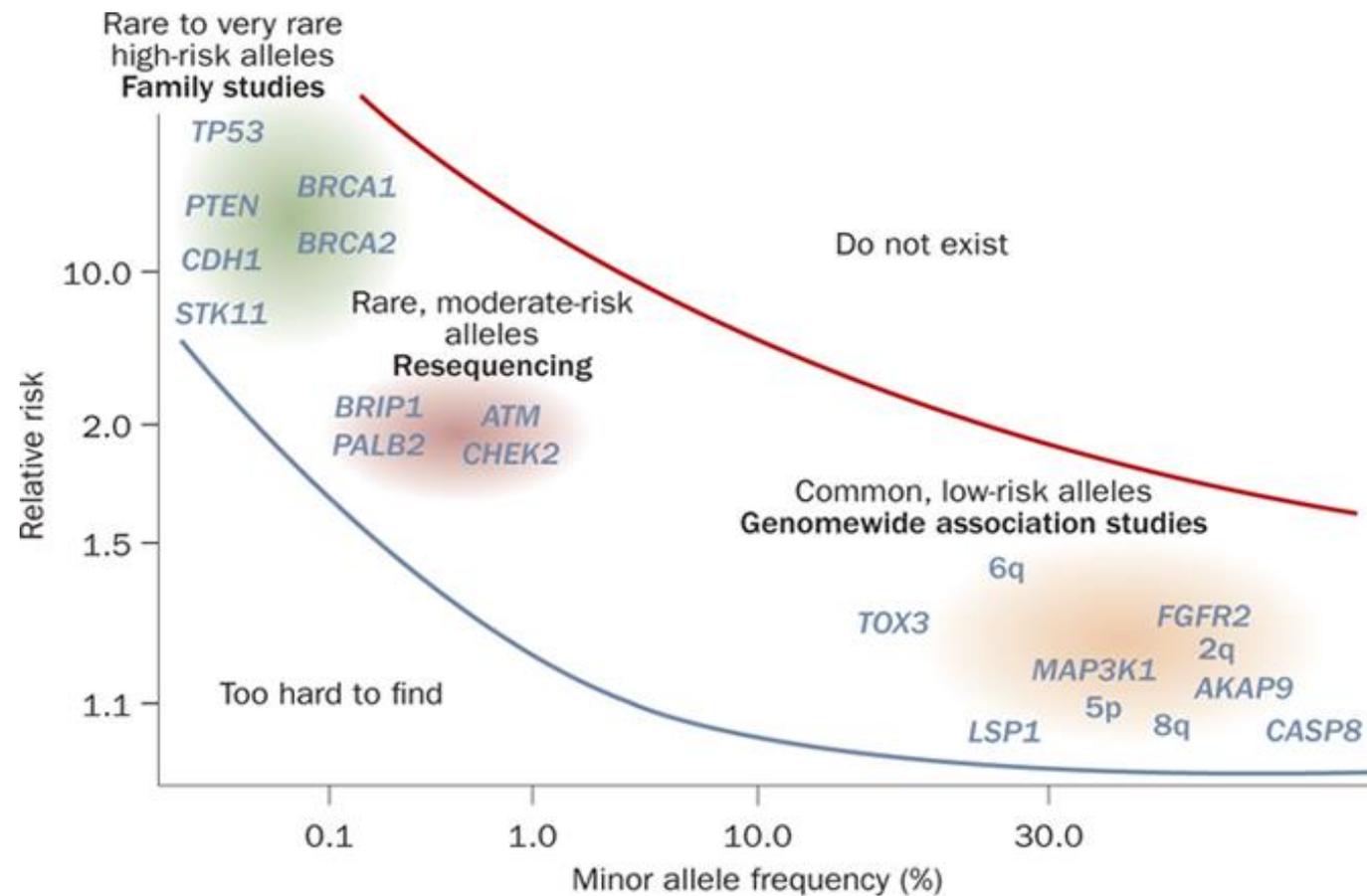
Q. How does genetic testing or a BRCA mutation affect by ability to obtain insurance?

- On May 4, 2017 the **Genetic Non-Discrimination Act (GNA)** was passed into law in Canada
- Under GNA, insurance companies cannot request or require a person to undergo genetic testing or to disclose any previous/future genetic test results
- Under GNA, federally regulated employers cannot use a person's genetic test results in employment decisions or request the results of an employee

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Frequently asked questions

Q. Are there other genes associated with hereditary breast and ovarian cancer?



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Frequently asked questions

Q. With these new genes, do I need to have updated genetic testing?

- Generally, the chances of having multiple gene mutations is low
- Given the high penetrance of BRCA1 and BRCA2, it is unlikely that having more genes tested would change your management
- In a small number of cases, there may be family history coming from both sides of the family or cancers that are not explained by the BRCA gene mutation – additional gene panel testing may be considered on an individual basis
- Speak with your genetic counsellor if you have any further questions or concerns

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Did you know?

Q. Where can my relatives get tested?

- Your relatives may be referred to their local genetics clinic by their family doctor
- It is helpful if they have a copy of your or another relatives positive BRCA result that accompanies the referral
- To find a local genetics clinic in Canada, visit the Canadian Association of Genetic Counsellor (CAGC) website: www.cagc-accg.ca
- For relatives living in the United States, their local genetics clinic can be found at www.nsgc.com

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Resources

Remember to keep in touch with your genetics clinic. The field of genetics and what we know about HBOC is constantly evolving.

- **Canadian Association of Genetic Counsellors:** www.cagc-aacg.ca
- **Canadian Cancer Society:** www.cancer.ca
- **FORCE:** Facing Our Risk of Cancer Empowered, www.facingourrisk.org
- **BRCA Carrier Conference (at WCH)** *every 2 years
- **Be Bright Pink:** <https://www.brightpink.org/>
- **Nicole Gojska, Genetic Counsellor at the Genetic/Hereditary Breast Cancer Clinic at Women's College Hospital (WCH):** Tel. 416-323-6400 ext. 2727
- **The Henrietta Banting Breast Centre (WCH)**
- **The Familial Ovarian Cancer Clinic (WCH)**

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