Understanding Breast Cancer Risk and Risk Assessment Tools

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Case #1

- 73 yr old lady
- Seeing infectious disease for recurrent UTI
- Using antibiotics 6-12 x per yr for 2 yrs
- Had not had sex with her husband in 4 yrs
- Menopause age 54
- Was on HRT from age 54-59 when she was advised to stop
- She continued her vaginal estrogen until age 62 when her family doctor strongly advised her to stop because of the risk of breast cancer
- Infectious disease specialist agreed, vaginal estrogen causes breast cancer

Disclosures

- **Advisory Boards** of the following companies in the past 2 yrs:
  - Astellas (fezolinitant), Biosyent (tibella), Searchlight (intrarosa)
- **Patents** for drugs and devices – NONE
- **Mitigating Potential Bias** – I will be speaking generally on guidelines and statements made by international, national and local medical societies and programs
- **Language** – I will use the word “women” in this presentation in discussing adults assigned female at birth and acknowledge that gender and sexuality are complex and that some may not identify with this term.

Objectives

Review of breast cancer

- Incidence of breast cancer
- Types of breast cancer

Discussion on estrogen, progesterone and progestins

- Menopausal hormone therapy and breast cancer risk
- Reproductive factors

Specific risks

- Genetic risk AND **Genetic testing**
- Breast density and screening

Risk assessment tools

- Gail model
- Breast Cancer Surveillance Consortium (BCSC) Invasive Breast Cancer Risk Calculator

Risk reduction

Breast Cancer

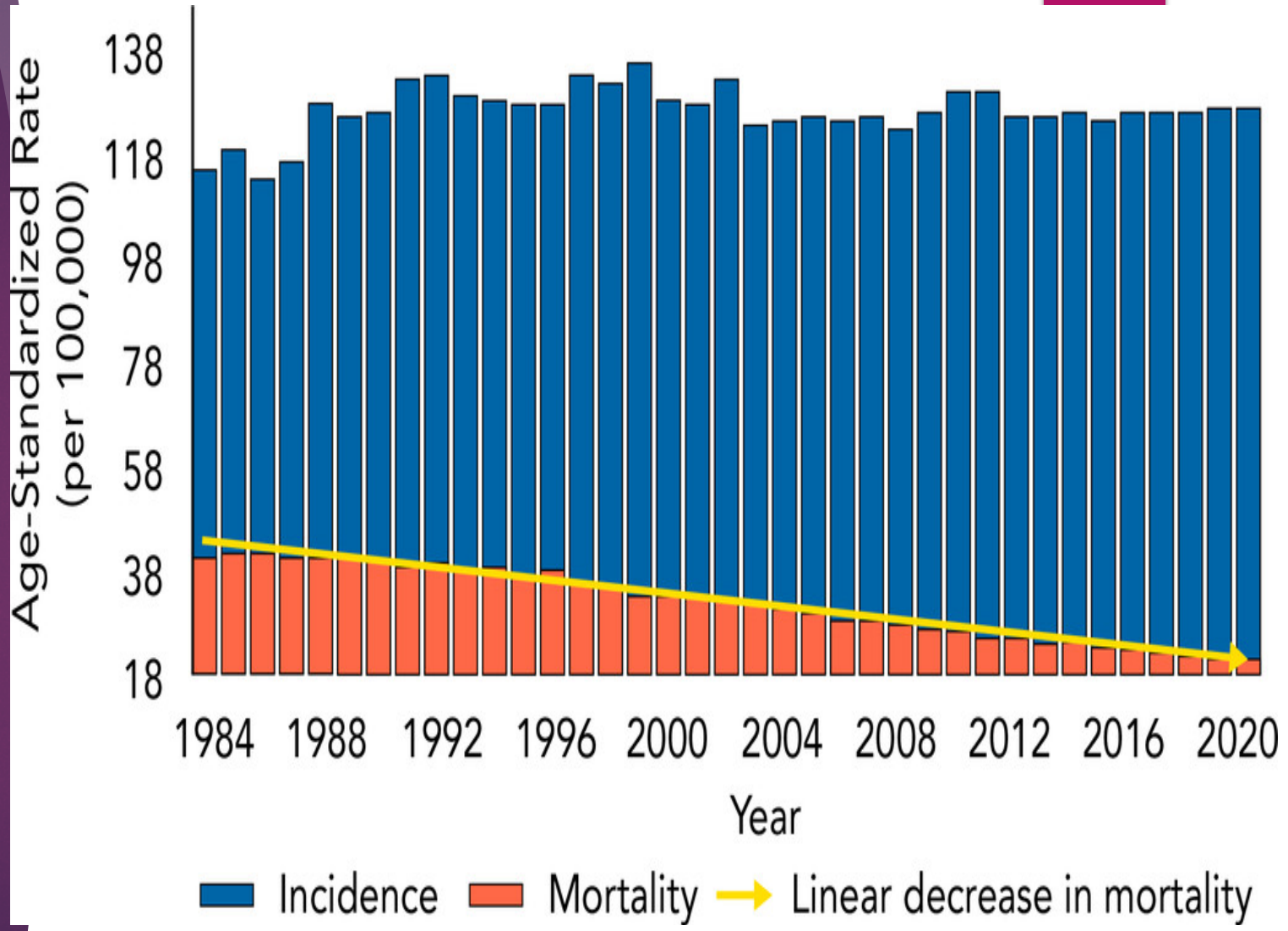
REVIEW

Canadian Cancer Society's 2019 predictive stats

- **1 in 8 women will be diagnosed with breast cancer in their lifetime (12%)**
- Of cancers in Canada
  - **Breast cancer = 25%**
  - Lung Cancer = 14%
  - Colorectal cancer = 11%
  - Uterine cancer = 7%
  - Thyroid cancer = 6%
- Absolute numbers of cancers in Canada in 2019
  - Lung cancer 29,300 cases
  - **Breast cancer 27,200 cases**
  - Colorectal cancers 26,300 cases
  - Prostate cancers 22,900 cases

Prevalence of Breast Cancer Survivors Among Canadian Women

Issue: Volume 20: Issue 9Online Publication Date: Sep 2022DOI: https://doi.org/10.6004/jnccn.2022.7028



Canadian Cancer Society 2023:

Age at diagnosis of breast cancer	% new cases of breast cancer	Mortality from breast cancer
Under 30	0.5%	
30-49	16.3%	16%
50-69	40.7%	8%
>70	33.4%	7%

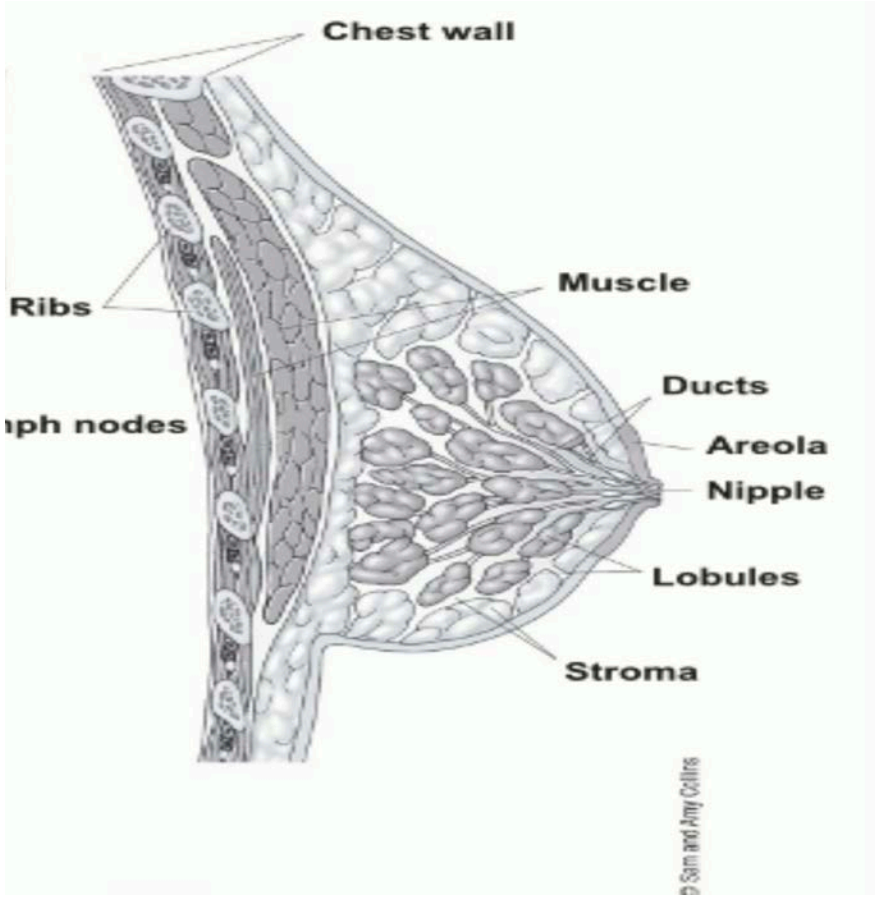
Types of breast cancer

Lobular carcinoma: 15% (15 out of 100) of cases.

- Start in the milk glands of the breasts

Ductal carcinoma: 75% (75 out of 100) of cases.

- Start in the ducts that carry milk from the breast glands to the nipple



Types of breast cancer

Receptor/Protein identification

- Estrogen receptor pos/neg
- Progesterone receptor pos/neg
- HER2 pos/neg
- Triple negative Breast Cancer

Other rare causes of breast cancer

- Angiosarcoma of the breast
- Inflammatory breast cancer
- Paget's Disease of the breast
- Phyllodes tumors

- American Cancer Society

Women have breasts, women have estrogen....does this mean estrogen causes breast cancer????

Schopenhauer's Stages of Truth

Truth passes through three stages

- First, it is ridiculed
- Second, it is violently opposed
- Third, it is accepted as being self evident

Does Estrogen Cause Breast Cancer?

- **Some physicians**
  - refuse to prescribes estrogens because of the belief that estrogen causes breast cancer
- **Canadian Cancer Society website**
  - in 2023 “estrogen causes breast cancer”
  - In 2024 “hormones, especially estrogen, are linked with breast cancer”
- **American Cancer Society**
  - “We do not know what causes each case of breast cancer. But we do know many of the risk factors for these cancers”
- **NAMS position paper on HRT 2022** states
  - Unopposed estrogen use was associated with **a reduced diagnosis of young-onset breast cancer**

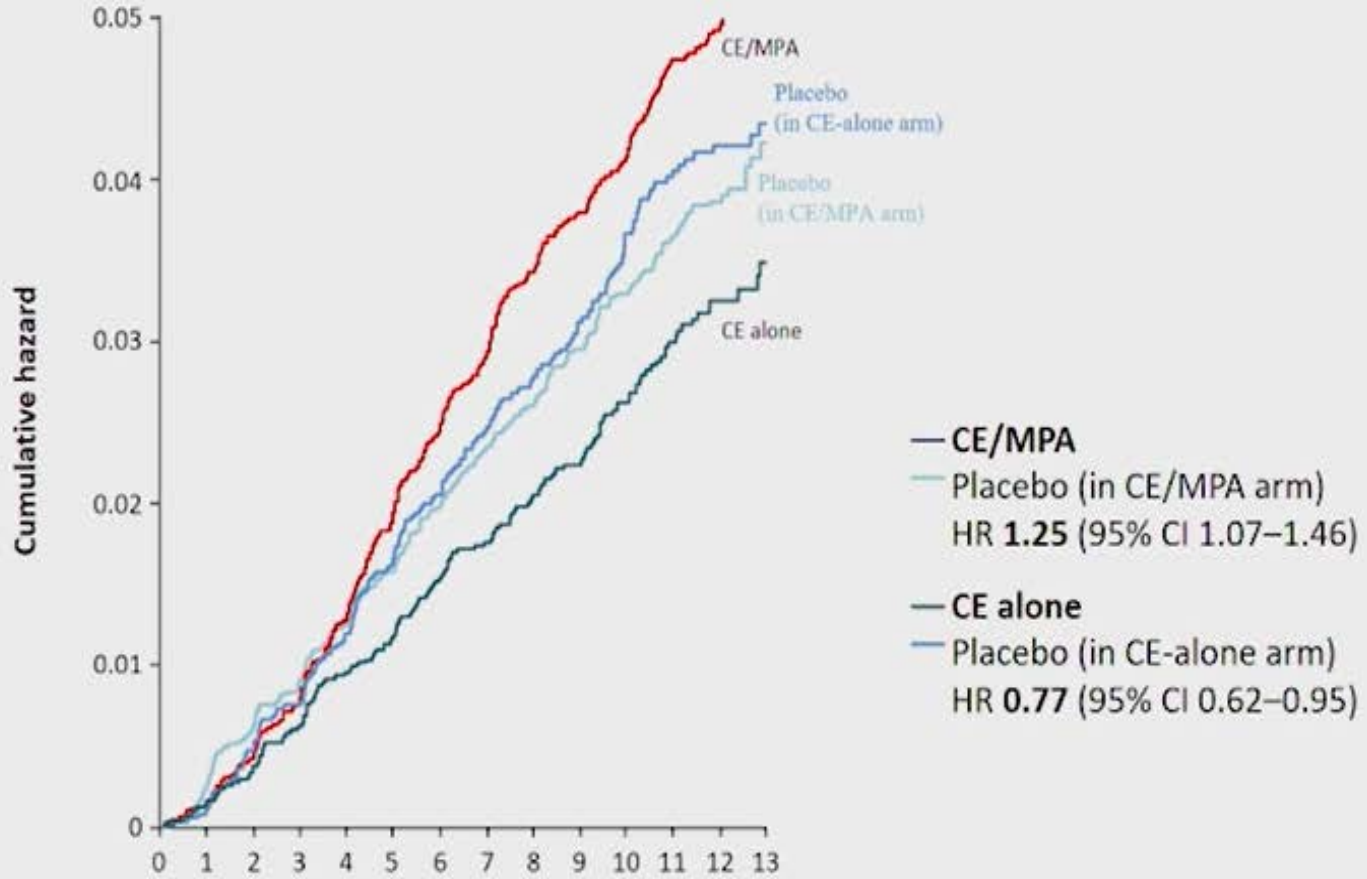
Breast cancer Canada.ca

There is no single cause of breast cancer but some factors that increase the risk of developing the disease include:

- Age: 83% of the cases of breast cancer occur in women over 50 years of age.
- Family history of breast cancer, especially in a mother, sister or daughter diagnosed before menopause, or if a mutation on the BRCA1 or BRCA2 genes is present.
- Previous breast disorders with biopsies showing abnormal cells.
- No full term pregnancies or having a full term first pregnancy after age 30.
- In post-menopausal women: obesity and physical inactivity.
- Beginning to menstruate at an early age.
- Later than average menopause.
- Taking hormone replacement therapy (estrogen plus progestin) for more than 5 years.
- Alcohol use
- Obesity

Variations in Associated Breast Cancer Risk Between CE alone and CE/MPA

Cumulative hazards, adjusted for age and race/ethnicity, for invasive breast cancer by randomization assignment in the WHI CE-alone and CE/MPA trials



Anderson GL, et al. *Lancet Oncol*. 2012;13(5):476–4

WHI HT Trials
Breast Cancer Mortality

End Points	No. of Deaths, Annualized Rates (%)		HR (95% CI)	Additional/Fewer Deaths per 10,000 Women per Year of HT
	Hormone Therapy	Placebo		
Breast cancer mortality – during intervention*				
CEE plus MPA vs placebo	5 (0.010)	4 (0.009)	1.08 (0.29-4.03)	1
CEE alone vs placebo	4 (0.010)	9 (0.023)	0.45 (0.14-1.46)	-1.3
Pooled trials			not reported	
Breast cancer mortality – 20.7-year cumulative follow-up				
CEE plus MPA vs placebo	71 (0.045)	53 (0.035)	1.35 (0.94-1.95)	1
CEE alone vs placebo	30 (0.031)	46 (0.046)	0.60 (0.37-0.97)	-1.5
Pooled trials			not reported	

*Median 5.6 years [interquartile range, 4.9-6.5 years] of intervention in CEE + MPA trial
*Median 7.2 years [interquartile range, 6.5-8.2 years] of intervention in CEE trial

Manson JE, et al. *JAMA* 2017;318:927-938.
Cheblowski, RT, et al. *JAMA* 2020;324:369-380.

Estrogen Therapy (ET) …significant 22% REDUCTION IN BREAST CANCER in WHI's long-term follow-up of that study. (Menopause , 2024)

Marginal HT	death	breast	lung	colorectal	ovarian
Estrogen only	0.81	0.84	0.87	0.88	0.87
CEE	0.87	0.77	0.90	0.89	0.82
E2	0.79	0.88	0.86	0.87	0.89
oral	0.89	0.77	0.91	0.87	0.81
transdermal	0.80	0.86	0.86	0.87	0.87

- https://journals.lww.com/menopausejournal/fulltext/2024/05000/use_of_menopausal_hormone_therapy_beyond_age_65.3.aspx

BRCA1 post oophorectomy:
INCIDENCE OF BREAST CANCER 10 YR DATA

- HORMONE REPLACEMENT THERAPY AFTER OOPHORECTOMY AND BREAST CANCER RISK AMONG BRCA1 MUTATION CARRIERS
- FOR THE HEREDITARY BREAST CANCER CLINICAL STUDY GROUP
- AUTHOR AFFILIATIONS ARTICLE INFORMATION
- JAMA ONCOL. 2018;4(8):1059-1065. DOI:10.1001/JAMAONCOL.2018.0211

The Two Sister Study of 1,419 sister-matched cases of breast cancer in women **aged younger than 50 years**

- no increased risk of young-onset breast cancer with use of EPT (OR, 0.80; 95% CI, 0.41-1.59)
- **unopposed estrogen use was associated with a reduced diagnosis of young-onset breast cancer** (OR, 0.58; 95% CI, 0.34-0.99)
- The absolute risk of breast cancer is low in women with genetic variants who undergo risk-reducing BO at a young age, and use of hormone therapy is considered acceptable.

WHIS age 50-59 -oral CEE alone

- **Decreased** incidence of (**PROTECTIVE**)
  - Coronary heart disease **6.0**/1000/5yrs
  - Invasive breast cancer **2.5**/1000/5yrs
  - Stroke **0.5**/1000/5yrs
  - Colorectal cancer **2.0**/1000/5yr
  - Fractures **7.5**/1000/5yr
  - Diabetes **12.5**/1000/5yrs
  - All cause mortality **6.0**/1000/5yr

Estrogen monotherapy DECREASES the incidence of breast cancer

Systemic estrogen monotherapy

reduces the incidence of breast cancer by 16%

reduces all cause mortality by 19%

Cancers arising while on HRT have been shown to have a more indolent biology and lower recurrence rates, better survival than breast cancer arising in former users or never users

The use of menopausal hormone therapy beyond age 65 years and its effects on women's health outcomes by types, routes and doses Baik et al Menopause:10.1097, published April 2024

Progestogens = progesterone and progestins

Progestogen= Progesterone + Progestins

Progestogen: a natural or synthetic steroid hormone that bind to and activates the progesterone receptor

Progesterone: a steroid hormone produced in the adrenal cortex and the gonads (ovaries and testes). It is also released by the corpus luteum during the first 10 weeks of pregnancy followed by the placenta in the later phase of pregnancy

Progestins: synthetic progestogens

Progesterone VS Progestins

Progesterone(micronized progesterone/prometrium)

- Bioidentical to human **P4**
- Endometrial protection
- Few androgenic SE
- Short T 1/2
- Sedative, improved sleep
- Lower VTE risk
- Less impact on breast/breast Ca
- Neuroprotection

Progestins (synthetic)

- Not the same as human P4
- Receptor action varies
  - progesterone
  - androgen
  - mineralocorticoid
- Endometrial suppression
- Long T1/2
- Some have increased VTE risk
- Some have increased risk of breast cancer

Progestins: by generation

First generation:

Medroxyprogesterone,

Norethindrone

Norethindrone acetate

Second generation:

Levonorgestrel

Norgestrel

Third generation: Anti-androgen

Desogestrel

Norgestimate

Fourth generation: anti-androgen

Drospirenone.

Medroxyprogesterone (provera): progestin used in the WHIS

- Synthetic progestin (1st generation)
- Derived from acetoxyprogesterone (derived from progesterone)
- **Binds** to endogenous **progesterone receptor** and mimics progesterone's hormone effects
- **More potent** than **progesterone**
- **Agonist for androgen and glucocorticoid receptors**
- *breast cell proliferation and Ki-67 gene expression (a nuclear antigen associated with cell proliferation) were significantly increases in CE plus MPA groups (but not E+MP) during 2 months of exposure*

Mammographic density change with estrogen and progestin therapy and breast cancer risk J Natl Cancer Institute, 2017 sept 1;109(90): djx001.

Placebo

- **Change of breast density from baseline to one year – no sign change in breast cancer risk**
- Mean change 0.05%
- Breast density A -2.8%
- Breast density B -0.51%
- Breast density C 0.40%
- Breast density D 2.2%

CEE plus **Medroxyprogesterone**

- **Change of breast density over one year from baseline to one year–**
- mean change 9.7%
- Breast density A 0.6%
- Breast density B 4.6%
- Breast density C 10.7%
- Breast density D 19.3% *
- *For every 1% increase in breast density, breast caner increased by 3.4%

Incidence of breast cancer

Progestogen monotherapy

Progestin only RR 1.21

Progesterone only RR 0.90

https://journals.lww.com/menopausejournal/fulltext/2024/05000/use_of_menopausal_hormone_therapy_beyond_age_65.3.aspx

HRT with micronized progesterone

-does not increase breast cancer risk for up to 5 years of treatment duration

French E3N cohort
https://pubmed.ncbi.nlm.nih.gov/29384406/

HRT with progestins

WHIS (Medroxyprogesterone)

RR 1.28 (1.11-1.48)

Absolute risk 1 additional/1000 women

Million Women Study (NETA/norgestrel/levonorgestrel)

RR 1.66 (1.58-1.75)

Absolute numbers: from the Womens Health Initiative Study

RISK	Absolute Increase in incidence of BC
obesity	**+47/1000/use yr**
physical inactivity	+**27/1000**/use yr
alcohol 2 per day	+**27/1000**/use yr
medroxyprogesterone plus CEE	<**2/1000**/use yr
CEE alone	-2/1000/use yr

Guidelines on menopausal hormone therapy

Position statements on estrogen use for menopausal symptoms

- **The Menopause Society (previously NAMS)**
  - Hormone therapy has been shown in double-blind RCTs to relieve VMS and is FDA approved as first-line therapy for relief of moderate to severe VMS because of menopause
- **American College of Obstetrics and Gynecology**
  - Increase risk of breast cancer with “menopausal hormone therapy with estrogen plus progestin (decreased risk with estrogen alone)”
- **College of Gynecology and Obstetrics of France**
  - “There is reasonable evidence that using transdermal estrogen in association with micronized progesterone or dydrogesterone may limit both the venous thromboembolic risk associated with oral estrogens and the risk of breast cancer associated with synthetic progestins”(Maturitas 2022 sept;163:62-81)

Use of hormone therapy in women with genetic risk factors for breast cancer MS position paper on hrt 2022

- hormone therapy use **does not** further increase the relative risk of breast cancer in women
  - with a family history of breast cancer,
  - after oophorectomy for BRCA 1 or 2 genetic variants,
  - having undergone a benign breast biopsy
  - BRCA 1 genetic variant carriers without prior history of breast cancer who underwent BO (mean age, 43.4 y)
    - **no increased risk of developing breast cancer** associated with **any use of hormone therapy** after a mean follow-up of 7.6 years

Reproduction

Reproduction: increased breast cancer risk

- Early Menarche (<age 11)
- Late menopause (>age 55)
- **Late pregnancy (first pregnancy over age 30)**
- Nullparity

Pregnancy Increases Breast Cancer Risk: peaks at 5 yrs post delivery

	Increased HR peak	Cross over from risk to protective	Decreased HR
Years post partum	5 yrs	24 yrs	34 yrs
HR	1.80	0.0	0.77

- Breast cancer risk after recent childbirth-A pooled analysis of 15 prospective studies(Annals of Internal Medicine Jan1, 2019)

Older Women with young children are at increased risk of breast cancer

Age at first pregnancy	Risk of breast cancer HR	HR peak (yrs) post delivery
< 25 yrs old	1.06	< 1 yr
age 25-34 yrs	1.25	4.6 yrs
age 35-39 yrs	1.4	6.4 yrs

Breast cancer risk after recent childbirth-A pooled analysis of 15 prospective studies(Annals of Internal Medicine Jan1, 2019)

Breast cancer risk

PRIORITIZING RESOURCE ALLOCATION

Comparison of breast cancer risk factors:

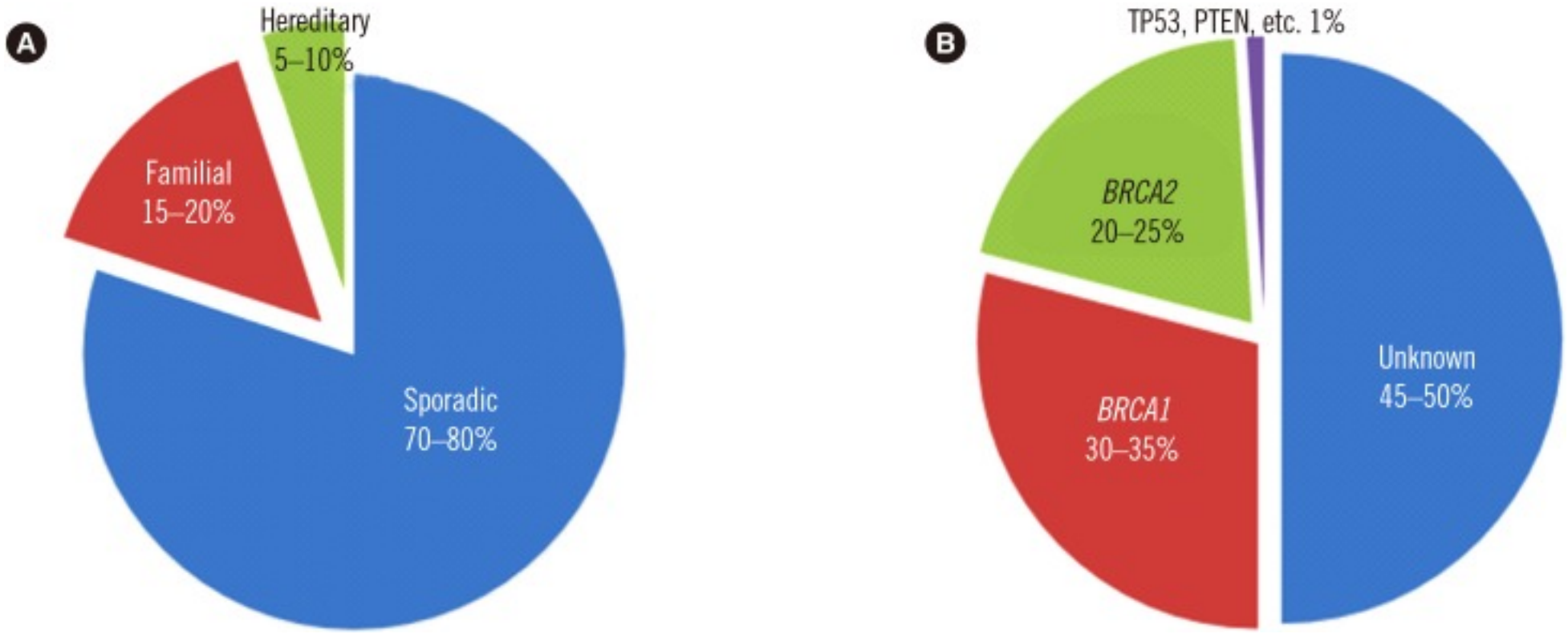
http://www.bccancer.bc.ca/screening/Documents/Breast-Density-Discussion-Guide.pdf

Risk factor	Estimated maximum relative risk
BRCA 1 or BRCA 2	15x
Personal history of breast cancer	7x-10x
Past atypical ductal hyperplasia	5x
Past atypical lobular hyperplasia LCIS	4x-10x
First degree relative breast cancer <age 50	2x
Obesity	1.3x
Alcohol use	1.6x
Birads D	1.4x
Birads C	1.3X

Genetics

BRCA 1, BRCA 2 – DNA REPAIR GENES

Incidence of breast cancer



- https://pmc.ncbi.nlm.nih.gov/articles/PMC6822003/

How to identify those that might be at risk of BRCA: Factors to look for in **family hx**

- **Especially Breast cancer <35yrs old, Breast cancer <50 yr old**
- **Ovarian cancer <u>any age</u>**
- **Bilateral breast cancer any woman**
- **Breast and ovarian cancer in same family (**The combination of pancreatic cancer and/or prostate cancer (metastatic or Gleason score ≥7) with breast cancer and/or ovarian cancer)
- **Multiple breast cancers on the same side of the family**
- **Male breast cancer**
- **Ashkenazi Jewish ethnicity**
  - **(BRCA general population 1:500, Ashkenazi Jewish population 1:50)**
    - Identification and management of women with a family history of breast cancer: Can fam Physician 2016;62:799-803

Genetic variant	Lifetime risk of breast cancer	Lifetime risk of contralateral breast cancer	Median age of breast cancer	% triple negative breast cancer	Ovarian cancer lifetime risk	Risk male breast cancer	Risk for other cancers
BRCA 1	73%	40%	39	>66%	40%		Colon Pancreatic Stomach Fallopian tube
BRCA 2	70%	50%	49	40%	20%	6%	Prostate Melanoma Pancreatic Gall bladder Common bile duct
Ave pop	12%	2% in 5 yrs	Age 50+	15-20%	1-2%	0.1%	

Risk-reducing salping-oophorectomy (RRSO) is considered the standard of care in *BRCA* carriers.

RRSO

- *reduces risk of dying from BRCA*-associated gynecologic cancer by **80–90%**
- reduces the risk of dying from Breast Cancer **by up to 50%**

Prophylactic mastectomy decreases risk of breast cancer by 95%

- *BRCA1/BRCA2* Pathogenic Variant Breast Cancer: Treatment and Prevention Strategies (Ann Lab Med. 2020 Mar; 40(2): 114–121.
  Published online 2019 Oct 23. doi: 10.3343/alm.2020.40.2.114)

Other known genetic conditions with increased risk for breast cancer

High penatrance

- **Li-Fraumeni syndrome** (TP53 mutation-tumor suppression gene)
- **CDH1** (hereditary diffuse gastric cancer)
- **Ataxia telangiectasia (AT)** (ATM mutation-DNA repair gene)
- **Cowden syndrome** (PTEN tumor suppressor gene)
- **Peutz-Jeghers syndrome** (STK11 or LKB1) –tumor suppression gene)
- **CHEK2 gene mutation** (tumor suppression gene)
- **PALB2 gene mutation** (dna repair gene)

Moderate penetrance

- Ataxia telangiectasia (ATM)
- BARDI
- BRIPI
- CHEK2
- RAD51C
- RAD51D
- Lynch syndrome (ovarian, colorectal, endometrial, gastric cancer, slight increased risk for breast cancer)

TESTING GUIDELINES:
NCCN Guideline version 3.2023hereditary cancer (BRCA1, BRCA2,CDH1,PALB2, PTEN and TP53)

Personal hx of breast cancer

- <age 50
- At any age if
  - Aid in treatment or adjuvant therapy
  - Triple-neg breast cancer
  - Multiple primary breast cancer
  - Lobular breast cancer AND family hx of gastric cancer
  - Male breast cancer
  - Ashkenazi Jewish Ancestry

Family Hx

- 1 or more close blood relatives (1, 2, 3 ‘ relatives on the same side of the family with)
  - Breast cancer <age 50
  - Male breast cancer
  - Ovarian cancer
  - Pancreatic cancer
  - Prostate cancer with mets
- 3 or more close blood relatives with breast cancer
- 2 or more close blood relatives with breast or prostate cancer (any grade)

Testing for BRCA

Target analysis:

- Ashkenazi Jewish population: 3 pathologic founder variants account for 99% of the pathological variants in individuals with Jewish ancestry
  - BRCA1c68, BRCA1c.55266dupC
  - BRCA2 c.5946delT

Multi gene panel

- Utilizes parallel sequencing
- Simultaneously tests more than 150 gens

  - https://www.ncbi.nlm.nih.gov/books/NBK279899/#app5.Multigene_Panels

Mainstream public pay for genetic testing in person with breast cancer

- NCCN – suggest breast cancer diagnosis <= age 50
- Ontario – will pay for genetic testing if breast cancer diagnosis <=age 45
- BC –will pay for genetic testing if BC diagnosis <=age 35, or triple neg BC diagnosed <60 yrs

- Other province either do not cover genetic testing or requires consultation with genetic counselor

Mainstream Hereditary Blood work req

http://www.bccancer.bc.ca/lab-services-site/Documents/Cancer%20Genetics%20HCP%20Multi-Gene%20Panel%20Requisition.pdf

Personal hx of

- Breast cancer
- Pancreatic cancer
- Metastatic prostate cancer
- Medullary Thyroid cancer
- Paraganglioma
- Renal cancer (<age47)
- Ashkenazi Jewish heritage

BC hereditary cancer referral form:
www.bccancer.bc.ca/hereditary

You are also welcome to contact HCP staff by email with questions about whether to make a referral

You can refer your patient to the Hereditary Cancer Program or they can refer themselves.

Private pay genetic testing: approx. $350 US

Invitae

https://www.invitae.com/

Screen project

www.womensresearch.ca/active-studies/the-screen-project-study/

Color

https://www.color.com/individuals-genomics

BC High Risk Breast Cancer Clinic

- People with breasts and a mutation in *BRCA1*, *BRCA2*, *ATM*, *CHEK2*, *CDH1, PALB2*, *PTEN*, *STK11*, *TP53*, or other gene associated with **greater than 25% increased lifetime risk of breast cancer.**
- People with Li Fraumeni syndrome (*TP53*), a syndrome associated with an increased risk of many different cancers.
- People with breasts between ages 30 to 50 with Neurofibromatosis 1 because of increased breast cancer risk.
  - **Referrals to the High Risk Clinic are given by genetic counsellors at the BC Cancer Hereditary Cancer Program**

Mammography and Breast Density

Dense breasts

- Breast density is an inherited trait
- Other factors that can affect breast density include:
- Age (pre-menopause)
- having children
- use of tamoxifen (hormone therapy drug)
- HRT with use after menopause – it depends
- having a low body mass index
- drinking alcohol

Description of breast density categories:

http://www.bccancer.bc.ca/screening/Documents/Breast-Density-Discussion-Guide.pdf

Breast density	Bi-rads A	Bi-rads B	Bi-rads C	Bi-rads D
description	Almost entirely fatty	Scattered fibroglandular density	Heterogenously dense	Extremely dense
%population	15%	44%	34%	7%
Mammogram sensativity	95.1%	92.5%	85.3%	72.5%

ESTIMATED RELATIVE RISK* OF AN INVASIVE BREAST CANCER DIAGNOSIS WITHIN TWO YEARS FOR BC WOMEN AGES 40-74 BY AGE GROUP AND BREAST DENSITY *http://www.bccancer.bc.ca/screening/Documents/Breast-Density-Discussion-Guide.pdf

Breast density	Age 40-49	Age50-59	Age 60-69	
A	0.60	0.68	0.74	
B	0.87	0.97	1.05	
C	1.15	1.24	1.31	
D	1.36	1.40	1.42	

Race and Ethnicity–Adjusted Age Recommendation for Initiating Breast Cancer Screening JAMA Network Open. 2023;6(4):e238893. doi:10.1001/jamanetworkopen.2023.8893

Breast Cancer mortality per 100 000 person-years for **ages 40 to 49** years was

- **27 deaths/100,000 person years in Black females**
- 15 deaths/100,000 person years in White females
- 11 deaths/100,000 person years in American Indian or Alaska Native, Hispanic, and Asian or Pacific Islander females

- **Black females should start screening 8 years earlier, at age 42 years,**

Supplemental breast screening testing:

http://www.bccancer.bc.ca/screening/Documents/Breast-Density-Discussion-Guide.pdf

BC Cancer Care states:

- There is currently insufficient evidence to prove that women with dense breast tissue as a sole risk factor will benefit from supplemental testing with other imaging modalities.

- If deemed appropriate, supplemental ultrasound is available to individuals in accordance with applicable BC Medical Services Commission Payment Schedule billing rules for breast ultrasound
  - http://www.bccancer.bc.ca/screening/Documents/Breast-Density-Discussion-Guide.pdf

Annual vs Biennial Mammography: Will the patient benefit from more frequent screening?

Estimate 6 yr cumulative risk of developing advanced breast cancer(**stage 2 or higher**) based on annual vs biennial mammography

- Age
- Race and ethnicity
- Family hx of breast cancer in first degree relative
- Hx breast biopsy
- Breast density
- BMI
- Menopausal status
- Screening interval

https://apps.apple.com/ca/app/bcscadvancedbreastcancerrisk/id1627084023

Tools to assess breast cancer risk

OVER 24 DIFFERENT BREAST CANCER RISK TOOLS EXIST

Breast Cancer Risk Assessment Tools for women gene neg or does not qualify for testing

GAIL MODEL

5 yr and lifetime risk (35-85 yrs old)

Menarche

Age at first live birth

Family hx of breast cancer in 1'relative

Previous biopsies

Hx atypical hyperplasia

BCSC Invasive Breast Cancer Risk Calculator

5 yr and 10 yr (age 40-74)

Race and ethnicity

Family hx of breast cancer

Breast biopsy(atypical ductal hyperplasia or lobular carcinoma in situ)

Breast density

Menopausal status

BMI

Age at first live birth

Breast cancer risk assessment tools

Gail: 5 yr and lifetime risk (35-85 yrs old)

https://bcrisktool.cancer.gov/calculator.html

BCSC Invasive Breast Cancer Risk Calculator 5 yr and 10 yr (age 40-74)

https://apps.apple.com/ca/app/bcsc-risk-calculator/id919034661

These results are based upon the following answers about the individual:

Age:
49

Race and Ethnicity:
White

Family History of Breast Cancer:
At least one first-degree and at least one second-degree

Benign Biopsy Result:
No prior biopsy

Breast Density:
Heterogeneously dense

Menopausal Status:
Postmenopausal

Body Mass Index:
18.5 - 24.99

First Live Birth:
Nulliparous

Back

Results

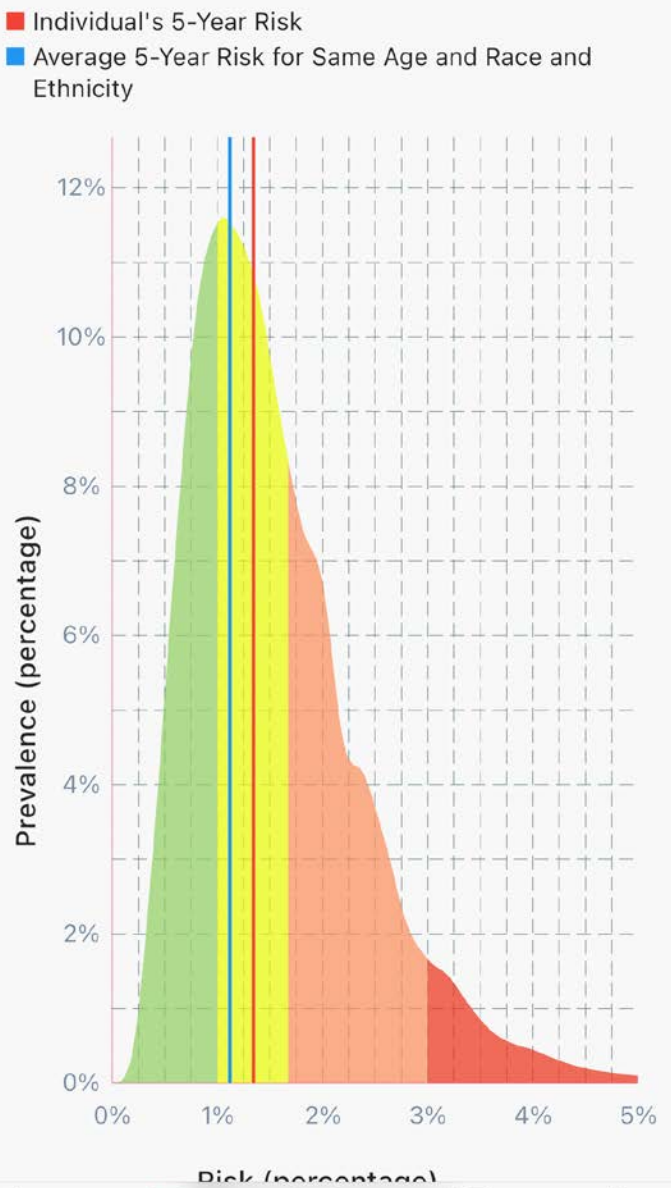
The individual's estimated risk for developing invasive breast cancer over the next 5 years is 1.34% (Average risk of invasive cancer)

The average 5-year risk for an individual of the same age and race and ethnicity is 1.12% (Average risk of invasive cancer)

The individual's estimated risk for developing invasive breast cancer over the next 10 years is 2.94% (Average risk of invasive cancer)

The average 10-year risk for an individual of the same age and race and ethnicity is 2.46% (Average risk of invasive cancer)

Distribution of 5-Year Risk for Invasive Breast Cancer for All Ages and Race and Ethnicity Categories



Home | Calculator | Graphs | Information | Settings

These results are based upon the following answers about the individual:

Age:
50

Race and Ethnicity:
White

Family History of Breast Cancer:
No family history (first-degree or second-degree)

Benign Biopsy Result:
No prior biopsy

Breast Density:
Extremely dense

Menopausal Status:
Premenopausal

Body Mass Index:
25.0 - 29.99

First Live Birth:
>= 35

Back

Results

The individual's estimated risk for developing invasive breast cancer over the next 5 years is 1.67% (Average risk of invasive cancer)

The average 5-year risk for an individual of the same age and race and ethnicity is 1.17% (Average risk of invasive cancer)

The individual's estimated risk for developing invasive breast cancer over the next 10 years is 3.63% (Average risk of invasive cancer)

The average 10-year risk for an individual of the same age and race and ethnicity is 2.56% (Average risk of invasive cancer)

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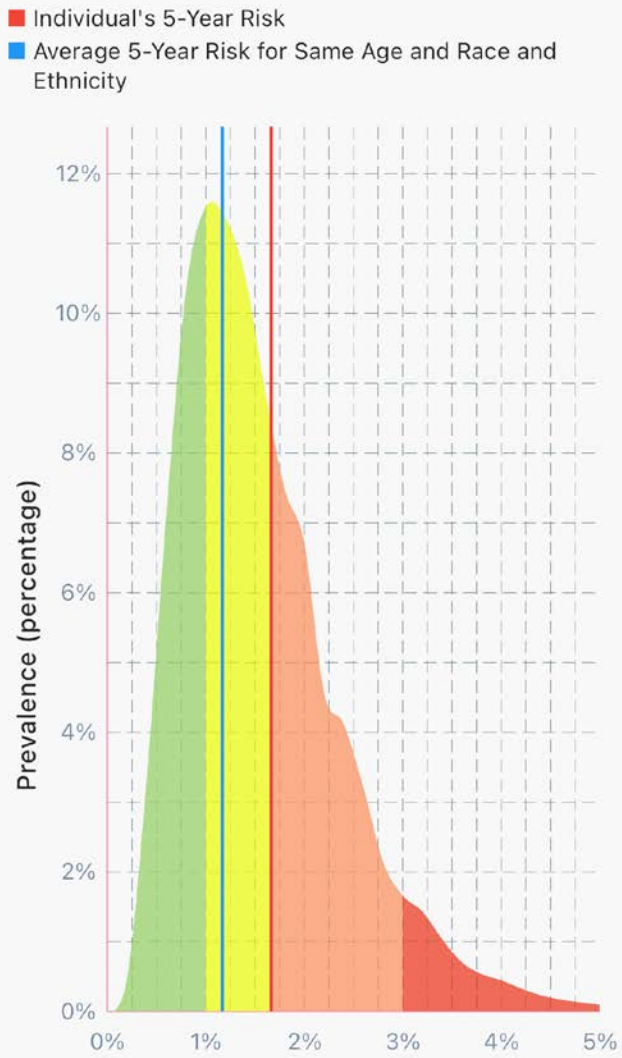
Results

Distribution of 5-Year Risk for Invasive Breast Cancer for All Ages and Race and Ethnicity Categories



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How to use the breast cancer risk tools
5 yr risk > 3%, 10 yr risk >5%

- Qualify for genetic testing?
- Discussion about lifestyle interventions to decrease breast cancer risk
- Evaluate frequency of monitoring for breast cancer
  - In office breast exam
  - Mammograms
  - Additional studies: Breast US, Contrast Mammogram, MRI
- Discussion chemoprevention for certain individuals
  - tamoxifen, raloxifene, exemestane, anastrozole for 5 years can reduce ER pos breast cancer risk by 49%

Decrease your Breast Cancer Risk

- Evaluate family history and consider genetic testing if at increased risk
- Limit alcohol (< 2 drinks per week)
- Healthy body weight (3 cup vegetables/day, 2 cups fruit/day, avoid fried food > 1xper month)
- Be active > 4 hours per week
- Be a non-smoker
- Breastfeed if you can
- Plan to have children at a younger age (age <30)

Obesity

- **BMI>31 has a 2.5 x greater risk of breast cancer**

  (compared to women with BMI <22.6)
- More than 50% of Canadians have excess weight
- Body weight is influenced by diet , exercise, genetics, where you live
- By 2042 excess body weight is projected to be the second leading preventable cause of cancer, after tobacco

Bccancer.bc.ca (www.fiveplus.ca)

- **There are some risk factors for breast cancer that you can't control, such as a family history of breast cancer.**
- You might be surprised to learn that, for many, lifestyle and behaviors are much more important factors for breast health than genetic influences.
- Only 5-10% of all breast cancers have a genetic cause
- **up to 42% of breast cancers are linked to lifestyle factors.**

Teaching opportunities with UBC Vancouver Fraser MD program

We're growing and hiring!

The MD program is expanding with increased enrolment and we’re seeking faculty to teach across the program in a wide range of opportunities and time commitments.

Contact form for teaching opportunities

Useful links

- Bc cancer: breast cancer and menopause guide for patients
  - https://bccancer.libguides.com/ld.php?content_id=36870709
- BC hereditary cancer referral form
  - http://www.bccancer.bc.ca/coping-and-support-site/Documents/Hereditary%20Cancer%20Program/HCP_Form-ReferralForm.pdf
- BC hereditary cancer program high risk clinic contact information
  - http://www.bccancer.bc.ca/library-site/Documents/HRC-Contact-2024.pdf
- Breast density discussion:
  - http://www.bccancer.bc.ca/screening/Documents/Breast-Density-Discussion-Guide.pdf
- BC cancer care: Managing menopause symptoms (updated dec 2020)
  - http://www.bccancer.bc.ca/health-info/types-of-cancer/breast-cancer/menopause
- Bc cancer risk assessment tool
  - https://bcrisktool.cancer.gov/

Thank you

Summary

- Personal and family hx are very important
- Genetics – BRCA positive women can be offered risk reducing surgeries, Ashkenazi Jewish heritage are at higher risk of brca 1,2 carriage
- women of black heritage deserve more thorough consideration and may benefit from earlier screening
- Greater Breast density increases risk of breast cancer and may hide a breast cancer on mammogram
- Lifestyle factors matter – exercise, healthy weight, limit alcohol
- Menopausal hormone therapy – if there is increased risk of breast caner suggest monotherapy estrogen if hysterectomy, and estrogen plus progesterone if uterus present. We need a RCT of transdermal estrogen and progesterone
- Women post partum have an increased risk of breast cancer that peaks 4-5 yrs after delivery, older women have more risk may consider screening in her 40's if she delivered in late 30' early 40's
- If Gail > 3 % consider risk reducing therapies in consultation with breast health specialist

TTNB (transgender, two spirit, non-binary) people who take estrogen

A large retrospective study found that TTNB people who take estrogen have a breast cancer rate higher than cisgender men but lower than cisgender women

The recommendation to begin screening after taking estrogen for five years is based on expert opinion and may not be applicable to all patients

- http://www.bccancer.bc.ca/family-oncology-network-site/Documents/2024%20Fall%20FPONjournal%20Sep16.pdf

Increased risk of breast cancer (NCCN)

- Residual lifetime risk of 20% or greater (largely due to Family hx)
- Genetic predisposition: family hx breast, ovarian, pancreatic cancer
- > 20% lifetime risk and Atypical Ductal Hyperplasia (ADH) or lobular carcinoma in situ (LCIS)
- Previous radiation therapy between age 10-30 yrs
- 5 yr risk of invasive breast cancer – GAIL model

https://pmc.ncbi.nlm.nih.gov/articles/PMC10229518/

- It is important to assess how use of the BCSC model in clinical practice will impact decision making. Risk assessment is often used to personalize clinical decision making for high-risk screening, including MRI screening, and to counsel patients on risk-reducing strategies such as chemoprevention. Among women with LCIS, MRI screening has been evaluated as an adjunctive screening modality but has not been shown to improve cancer detection [15, 16]. Given these data and the predisposition for luminal-type breast cancers, MRI screening is not standard for screening women with LCIS at our institution. Further studies are ongoing to assess the optimal supplemental imaging modality for women with BBD.

- Chemoprevention has been proven to significantly reduce the likelihood of developing breast cancer among women with LCIS [17–19]. The National Surgical Adjuvant Breast and Bowel Project (NSABP) P-1 Trial randomized high-risk women to tamoxifen versus placebo for 5 years; among the 826 women with LCIS, a 56% reduction in breast cancer incidence was observed with tamoxifen use. Importantly, no woman with LCIS in our series had a 10-year BCSC score for invasive cancer development lower than 10, and therefore this model does not appear to select a subset of women with LCIS whose risk is low enough to omit consideration of chemoprevention. While the BCSC model provides a more accurate risk prediction than the Tyrer-Cuzick model among women with LCIS, it should be used with caution to guide clinical judgement, given its modest discrimination of risk among this group and the proven benefit of chemoprevention in this population. Furthermore, 64 women (30% of women with cancer) developed DCIS, which is not accounted for in the BCSC model, highlighting that the BCSC model does not fully capture overall breast cancer risk for this population.

- Limitations of this study include those inherent to a retrospective study and our reliance on chart review for data abstraction. In addition, use of the BCSC model has inherent limitations when applied to a population of women with LCIS. For example, while the model incorporates breast density, it omits other factors that have been shown to impact risk in this population, including volume of LCIS and use of chemoprevention [12, 17–19]. Because chemoprevention use is not accounted for in the BCSC model, 295 women (18%) in our LCIS population who took chemoprevention were excluded from analysis. While we did not include women with a known BRCA mutation in this series, hereditary breast cancer syndromes are not included in the model and this remains a limitation of its use [5]. In addition, while the BCSC model includes race, given that our population was predominantly White, the results might not apply across all ethnicities.