Counseling your patients about screening mammograms

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Learning Objectives

- Describe the rationale for current USPSTF guidelines for breast cancer screening
- Assess individual breast cancer risk in patients
- Effectively counsel a patient regarding risks and benefits of and when to start screening mammography

Case History #1

A.S. is a 44 year old woman with no breast complaints who comes in to discuss breast cancer screening.

She has never had a screening mammogram.

She read on the internet that women who are under 50 should see their doctor before getting a mammogram.

Case History #1

PMHx: None.

PSHx: No previous breast biopsies.

POB/GYN Hx: Onset of menses age 13, regular menses q 30 days, G3 P3, singleton births at age 24, 31, and 33.

SH: No tobacco, 1 – 2 drinks of alcohol weekly on average, no illicit drug use or HIV risk.

FH: + Unilateral breast cancer in paternal grandmother, onset late 60's. No ovarian, colon, prostate, male breast cancer, or bilateral breast cancers or other cancer.

PE: AA woman in NAD. Her BMI is 24.5 and her clinical breast exam is normal.

Case History #1 Questions

- What is the breast cancer screening recommendation for this woman?
- What risks and benefits will breast cancer screening give her?
- What is her risk for breast cancer?
- How can you help her to decide when to start getting breast cancer screening?

Incidence of Breast Cancer

- In 2009 in the United States, an estimated 193,370 women will develop breast cancer, and an estimated 40,170 women will die of breast cancer.

Jemal A, Siegel R, Ward E, Hao Y, Xu J, Thun MJ. Cancer statistics, 2009. *CA Cancer J Clin* 2009;59:225-49. [PMID: 19474385

USPSTF Guidelines:

Summary of Recommendations

- **The USPSTF recommends biennial screening mammography for women aged 50 to 74 years.**
  Grade: B recommendation.
- **The decision to start regular, biennial screening mammography before the age of 50 years should be an individual one and take patient context into account, including the patient's values regarding specific benefits and harms.**
  Grade: C recommendation.

USPSTF Guidelines (cont).

- **The USPSTF concludes that the current evidence is insufficient to assess the additional benefits and harms of screening mammography in women 75 years or older.** Grade: I Statement.
- **The USPSTF recommends against teaching breast self-examination (BSE).** Grade: D recommendation.
- **The USPSTF concludes that the current evidence is insufficient to assess the additional benefits and harms of clinical breast examination (CBE) beyond screening mammography in women 40 years or older.** Grade: I Statement.

U.S. Dept. of Health and Human Services Agency for Healthcare Research and Quality: Guide to Clinical Preventive Services, 2009. AHRQ Pub.No.09-1P006, 08/09. www.preventiveservices.ahrq.gov.

Breast Cancer Screening

- **The USPSTF concludes that the current evidence is insufficient to assess the additional benefits and harms of either digital mammography or magnetic resonance imaging (MRI) instead of film mammography as screening modalities for breast cancer.**
  Grade: I Statement.

Update on summary of the evidence: November, 2009

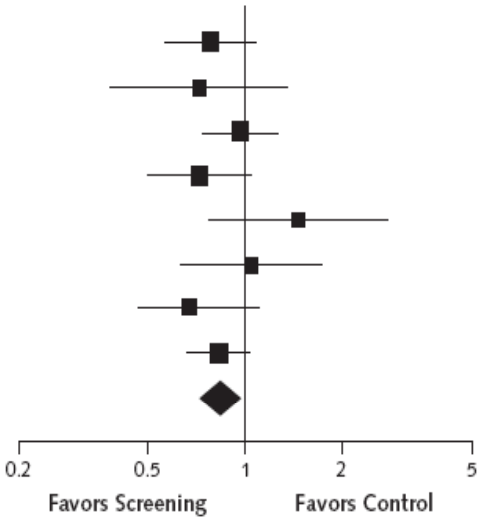
- Key questions regarding:
  - population for screening
  - outcomes and harm associated with screening
  - screening interval

  (for women at average risk of breast cancer)

Nelson, H et al. Screening for Breast Cancer: An Update for the U.S. Preventive Services Task Force. Ann Intern Med 2009;151:727-737.

Key Question: Does screening mammography reduce breast cancer mortality in women aged 39-49:

Figure. Pooled relative risk for breast cancer mortality from mammography screening trials compared with control for women aged 39 to 49 years.



Study/Author, Year (Reference)	Relative Risk for Breast Cancer Mortality (95% CrI)	Relative Risk for Breast Cancer Mortality (95% CrI)	Events/Total, *n/n* Screening	Events/Total, *n/n* Control
HIP/Habbema et al, 1986 (27)		0.78 (0.56–1.08)	64/13 740	82/13 740
Kopparberg*/Tabar et al, 1995 (31)		0.72 (0.38–1.37)	22/9582	16/5031
CNBSS-1/Miller et al, 2002 (28)		0.97 (0.74–1.27)	105/25 214	108/25 216
Malmö/Nyström et al, 2002 (26)		0.73 (0.51–1.04)	53/13 568	66/12 279
Stockholm/Nyström et al, 2002 (26)		1.47 (0.77–2.78)	34/14 303	13/8021
Östergötland*/Nyström et al, 2002 (26)		1.05 (0.64–1.73)	31/10 285	30/10 459
Gothenberg/Bjurstam et al, 2003 (30)		0.70 (0.46–1.06)	34/11 724	59/14 217
Age/Moss et al, 2006 (29)		0.83 (0.66–1.04)	105/53 884	251/106 956
Total		0.85 (0.75–0.96)	448/152 300	625/195 919

CNBSS-1 = Canadian National Breast Screening Study-1; CrI = credible interval; HIP = Health Insurance Plan of Greater New York.
* Swedish Two-County trial.

Nelson, H et al. Screening for Breast Cancer: An Update for the U.S. Preventive Services Task Force. Ann Intern Med 2009;151:727-737.

Key Question: Harms Associated with Breast Cancer Screening

- Radiation exposure:
  - Most x-rays are considered low-dose, low-energy radiation, with the mean glandular dose of bilateral, 2-view mammography averaging 7 mGy. (High dose exposure: 300-43400 mGy RR 1.33-11.39).
  - Women aged 40 to 49 years, yearly mammography screening for 1 decade with potential additional imaging would expose an individual to approximately 60 mGy.
  - High levels of radiation exposure (4 Gy to 40Gy) in childhood/early adulthood associated with increased risk for breast cancer.*

Exposure is low-dose. Inconsistent association with increased risk for breast cancer.

**Henderson, TO et al. Systemic Review: Surveillance for Breast Cancer in Women treated with chest radiation for childhood adolescent or young adult cancer. Ann Intern Med. 2010 Apr 6;152(7):444-55; W144-54.*

Key Question:Harms and Outcomes Associated with Screening

- Pain associated with mammography screening
- Anxiety and distress: False-positive mammography results had no consistent effect on most women's general anxiety and depression but increased breast cancer-specific distress, anxiety, apprehension, and perceived breast cancer risk for some.
- Overdiagnosis (rates from 1-10%)

Harms Associated With Mammography Screening (Key Question 2a) (continued)

Table 2. Age-Specific Screening Results From the BCS

Screening Result	Age Group				
	40-49 y	50-59 y	60-69 y	70-79 y	80-89 y
Outcomes per screening round (per 1000 screened), n*					
False-negative mammography result	1.0	1.1	1.4	1.5	1.4
False-positive mammography result	97.8	86.6	79.0	68.8	59.4
Additional imaging	84.3	75.9	70.2	64.0	56.3
Biopsy	9.3	10.8	11.6	12.2	10.5
Screening-detected invasive cancer	1.8	3.4	5.0	6.5	7.0
Screening-detected DCIS	0.8	1.3	1.5	1.4	1.5
Yield of screening per screening round, *n*					
Patients undergoing mammography to diagnose 1 case of invasive breast cancer†	556	294	200	154	143
Patients undergoing additional imaging to diagnose 1 case of invasive breast cancer‡	47	22	14	10	8
Patients undergoing biopsy to diagnose 1 case of invasive breast cancer§	5	3	2	2	1.5

BCSC = Breast Cancer Surveillance Consortium; DCIS = ductal carcinoma in situ.

* Calculated from BCSC data of regularly screened women on the basis of results from a single screening round. Rates of additional imaging and biopsies may be underestimated because of incomplete capture of these examinations by the BCSC.

† 1 per rate of screening-detected invasive cancer.

‡ Rate of additional imaging per rate of screening-detected invasive cancer.

§ Rate of biopsy per rate of screening-detected invasive cancer.

Nelson, H et al. Screening for Breast Cancer: An Update for the U.S. Preventive Services Task Force. Ann Intern Med 2009;151:727-737.

False positive and negative results and additional procedures

- False-positive mammography results are common in all age groups but are most common among women aged 40 to 49 years (97.8 per 1000 women per screening round).
- False-negative mammography results occur least among women aged 40 to 49 years (1.0 per 1000 women per screening round).
- Rates of additional imaging are highest among women aged 40 to 49 years (84.3 per 1000 women per screening round) and decrease with age, whereas biopsy rates are lowest among women aged 40 to 49 years (9.3 per 1000 women per screening round) and increase with age.
- For every case of invasive breast cancer detected by mammography screening in women aged 40 to 49 years, 556 women have mammography, 47 have additional imaging, and 5 have biopsies.

Summary

- Mammography screening reduces breast cancer mortality by 15% for women aged 39 to 49 years (relative risk, 0.85 [95% CI, 0.75 to 0.96]; 8 trials).
- Data are lacking for women aged 75 years or older.
- Radiation exposure from mammography is low.
- Patient adverse experiences are common and transient and do not affect screening practices.
- Overdiagnosis ranges from 1-10%.
- Younger women have more false-positive mammography results and additional imaging.

http://www.ncbi.nlm.nih.gov/bookshelf/br.fcgi?book=es74

Mammography in Older Women

- Relative risk for breast cancer mortality for women screened for breast cancer aged 70-74: 1.12 (CI 0.73-1.72)

Nelson, H et al. Screening for Breast Cancer: An Update for the U.S. Preventive Services Task Force. Ann Intern Med 2009;151:727-737.

Clinical Breast Exam

- No clear additional benefit to doing clinical breast exam with mammography compared to clinical breast exam alone

Nelson, H et al. Screening for Breast Cancer: An Update for the U.S. Preventive Services Task Force. Ann Intern Med 2009;151:727-737.

Self Breast Exam

- Relative risk of all cause mortality in women doing self-breast exam diagnosed with breast cancer: 1.07 (CI 0.88 to 1.29)

Nelson, H et al. Screening for Breast Cancer: An Update for the U.S. Preventive Services Task Force. Ann Intern Med 2009;151:727-737.

Key Clinical Question: Screening Interval for Screening mammography

- Evaluate U.S. Breast Cancer Screening Strategies (6 models using common data elements)

http://www.uspreventiveservicestaskforce.org/uspstf09/breastcancer/brcanart.htm

Interval for screening mammography

Table 2. Percentage of Reduction in Breast Cancer Mortality Maintained When Moving From an Annual Screening Interval to a Biennial Interval, by Screening Strategy and Model

Model*	Maintained Reduction in Breast Cancer Mortality, by Screening Strategy, %†									
	Ages 50–69 y	Ages 40–69 y	Ages 45–69 y	Ages 40–79 y	Ages 40–84 y	Ages 55–69 y	Ages 60–69 y	Ages 50–74 y	Ages 50–79 y	Ages 50–84 y
D	76	75	78	79	82	83	79	81	78	83
E	75	73	74	75	75	75	73	76	75	76
G	85	86	91	87	88	91	86	89	88	89
M	90	96	97	97	99	92	84	95	93	95
S	74	73	78	76	77	80	74	79	85	79
W	68	67	70	70	71	71	70	72	70	73

* Model group abbreviations: D = Dana-Farber Cancer Institute; E = Erasmus Medical Center; G = Georgetown University; M = M.D. Anderson Cancer Center; S = Stanford University; W = University of Wisconsin/Harvard.

† Differences in the range of results reflect differences in modeling approaches. For example, the benefit of screening in model M is modeled through stage shift, as with most other models, but also includes a "beyond stage shift" factor based on a cure fraction for small tumors. However, because many of these "cures" occur among women with invasive cancer that is not fatal, finding such cancer 1 year earlier confers very little mortality advantage to annual (vs. biennial) screening.

Mandelblatt, JS et al. Effects of Mammography Screening Under Different Screening Schedules: Model Estimates of Potential Benefits and Harms. Ann Int Med 2009;151:738-47.

Interval for screening mammography

Table 3. **Incremental Changes in Percentage of Reduction in Breast Cancer Mortality and Life-Years Gained per 1000 Women, by Age of Screening Initiation and Cessation**

Model*	Start at Age 40 y vs. 50 y†						Stop at Age 79 y vs. 69 y‡					
	Difference in Percentage of Reduction in Breast Cancer Mortality		Difference in Breast Cancer Deaths Averted per 1000 Women		Difference in Life-Years Gained per 1000 Women		Difference in Percentage of Reduction in Breast Cancer Mortality		Difference in Breast Cancer Deaths Averted per 1000 Women		Difference in Life-Years Gained per 1000 Women	
	Annual	Biennial	Annual	Biennial	Annual	Biennial	Annual	Biennial	Annual	Biennial	Annual	Biennial
D	3	2	1	1	25	20	11	9	3	3	28	26
E	8	5	2	1	58	40	8	6	2	2	18	15
G	3	3	1	1	34	29	7	7	2	2	27	25
M	2	3	1	1	11	18	7	7	2	2	21	21
S	2	1	1	1	32	21	10	10	4	4	38	31
W	10	6	2	1	57	37	8	6	2	1	19	15
Median across models	3	3	1	1	33	25	8	7	2	2	24	23.5

* Model group abbreviations: D = Dana-Farber Cancer Institute; E = Erasmus Medical Center; G = Georgetown University; M = M.D. Anderson Cancer Center; S = Stanford University; W = University of Wisconsin/Harvard.
† Incremental difference between screening from 40 to 69 y versus 50 to 69 y.
‡ Incremental difference between screening from 50 to 79 y versus 50 to 69 y.

Mandelblatt, JS et al. Effects of Mammography Screening Under Different Screening Schedules: Model Estimates of Potential Benefits and Harms. Ann Int Med 2009;151:738-47.

Interval for screening mammography

Table 4. **Benefits and Harms Comparison of Different Starting and Stopping Ages Using the Exemplar Model***

Strategy	Average Screenings per 1000 Women	Potential Benefits (vs. No Screening)			Potential Harms (vs. No Screening)†	
		Percentage of Mortality Reduction	Cancer Deaths Averted per 1000 Women	Life-Years Gained per 1000 Women	False-Positive Results per 1000 Women	Unnecessary Biopsies per 1000 Women
Comparison of different starting ages						
Biennial screening						
40–69 y	13 865	16‡	6.1	120‡	1250	88
45–69 y	11 771	17‡	6.2	116‡	1050	74
50–69 y	8944	15	5.4	99	780	55
55–69 y	6941	13	4.9	80	590	41
60–69 y	4246	9	3.4	52	340	24
Annual screening						
40–69 y	27 583	22‡	8.3	164‡	2250	158
45–69 y	22 623	22‡	8.0	152‡	1800	126
50–69 y	17 759	20‡	7.3	132‡	1350	95
55–69 y	13 003	16‡	6.1	102‡	950	67
60–69 y	8406	12‡	4.6	69‡	600	42
Comparison of different stopping ages						
Biennial						
50–69 y	8944	15	5.4	99	780	55
50–74 y	11 109	20	7.5	121	940	66
50–79 y	12 347	25	9.4	130	1020	71
50–84 y	13 836	26	9.6	138	1130	79
Annual						
50–69 y	17 759	20‡	7.3	132‡	1350	95
50–74 y	21 357	26‡	9.5	156‡	1570	110
50–79 y	24 439	30	11.1	170	1740	122
50–84 y	26 913	33	12.2	178	1880	132

* Results are from model S (Stanford University). Model S was chosen as an exemplar model to summarize the balance of benefits and harms associated with screening 1000 women under a particular screening strategy.
† Overdiagnosis is another significant harm associated with screening. However, given the uncertainty in the knowledge base about ductal carcinoma in situ and small invasive tumors, we felt that the absolute estimates are not reliable. In general, overdiagnosis increases with age across all age groups but increases more sharply for women who are screened in their 70s and 80s.
‡ Strategy is dominated by other strategies; the strategy that dominates may not be in this table.

http://www.ahrq.gov/clinic/uspstf09/breastcancer/brcanart.pdf

Summary of Screening Interval

- Biennial screening achieves most of the benefit of annual screening with less harm. Decisions about the best strategy depend on program and individual objectives and the weight placed on benefits, harms, and resource considerations.

Mandelblatt, JS et al. Effects of Mammography Screening Under Different Screening Schedules: Model Estimates of Potential Benefits
and Harms. Ann Int Med 2009;151:738-47.

Current USPSTF Guidelines:

"So, what does this mean if you are a woman in your 40s? You should talk to your doctor and make an informed decision about whether mammography is right for you based on your family history, general health, and personal values."

Diana Petitti, MD, MPH
Vice Chair, U.S. Preventive Services Task Force
November 19, 2009

American College of Physicians Guidelines

- **Recommendation 1**: *In women 40 to 49 years of age, clinicians should periodically perform individualized assessment of risk for breast cancer to help guide decisions about screening mammography.*

  The 5-year breast cancer risk can vary from 0.4% for a woman age 40 years with no risk factors to 6.0% for a woman age 49 years with several risk factors.

American College of Physicians Guidelines

- **Recommendation 2:** ***Clinicians should inform women 40 to 49 years of age about the potential benefits and harms of screening mammography.***

American College of Physicians Guidelines

- **Recommendation 3:** ***For women 40 to 49 years of age, clinicians should base screening mammography decisions on benefits and harms of screening, as well as on a woman's preferences and breast cancer risk profile.***

American College of Physicians Guidelines

- **Recommendation 4: *We recommend further research on the net benefits and harms of breast cancer screening modalities for women 40 to 49 years of age.***

http://www.acponline.org/pressroom/mam_guideline.htm

Counseling your patient

- Risk assessment and perception of risk
- Personal values and self-efficacy in decision making

General Health

- Personal History
- Breast complaints (pain, discharge, mass, skin changes)
- Risk Factors, including family history
- Life expectancy

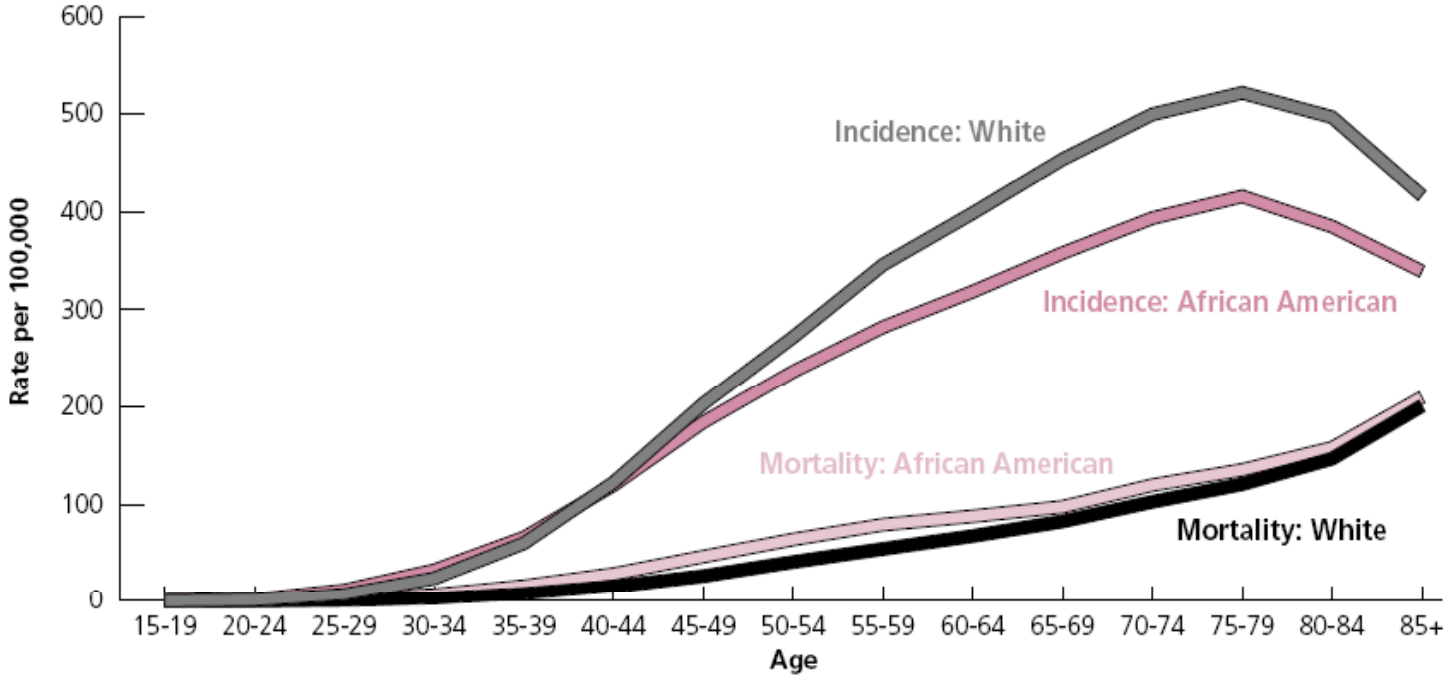
Risk Factors

- Female
- Age >40
- Family History (Maternal and Paternal)
- Previous malignancy, esp. Breast/ovarian
- Exposure to endogenous hormonal cycling (parity, onset of menarche/menopause, breast feeding, nulliparity or 1st child after age 30)
- Exposure to supradiaphragmatic radiation (RR 4.1*)
- Proliferative histology on previous biopsy
- Obesity/alcohol use/hormone replacement

*Alm El-Din MA et al. Breast cancer after treatment of Hodgkin's lymphoma: general review. Int J Radiat Oncol Biol Phys. 2008 Dec 1;72(5):1291-7.

Age as a risk factor for breast cancer

Figure 1. Female Breast Cancer – Age-Specific Incidence and Death Rates, by Race, United States, 1996-2000



Data sources: *Incidence* – Surveillance, Epidemiology, and End Results Program, 1973-2000, Division of Cancer Control and Population Science, National Cancer Institute, 2003. *Deaths* – National Center for Health Statistics, Centers for Disease Control and Prevention, 2003.

American Cancer Society, Surveillance Research, 2003

Modifiable Risk Factors

- Exercise 1.5 to 4 hours weekly
- BMI below 25
- Low alcohol consumption
- Having children before age 30
- Breastfeeding more than 7 months
- Use of hormone replacement therapy

Family History

Table 4

Standardised incidence ratios (SIRs) of breast cancer by the number of first-degree relatives diagnosed with breast cancer of ⩽50 years

	Observed (rate per 10^5)	Expected (rate per 10^5)	SIRs	95% CI	*P*-value
No first-degree relative with breast cancer of ⩽50 years (*N*=607)	25 (678.2)	7.11 (192.9)	3.52	2.38–5.19	<0.0001
One first-degree relative with breast cancer of ⩽50 years (*N*=677)	27 (646.9)	6.29 (150.7)	4.29	2.95–6.25	<0.0001
Two or more first-degree relatives with breast cancer of ⩽50 years (*N*=207)	12 (965.4)	3.08 (247.8)	3.90	2.23–6.81	0.0006

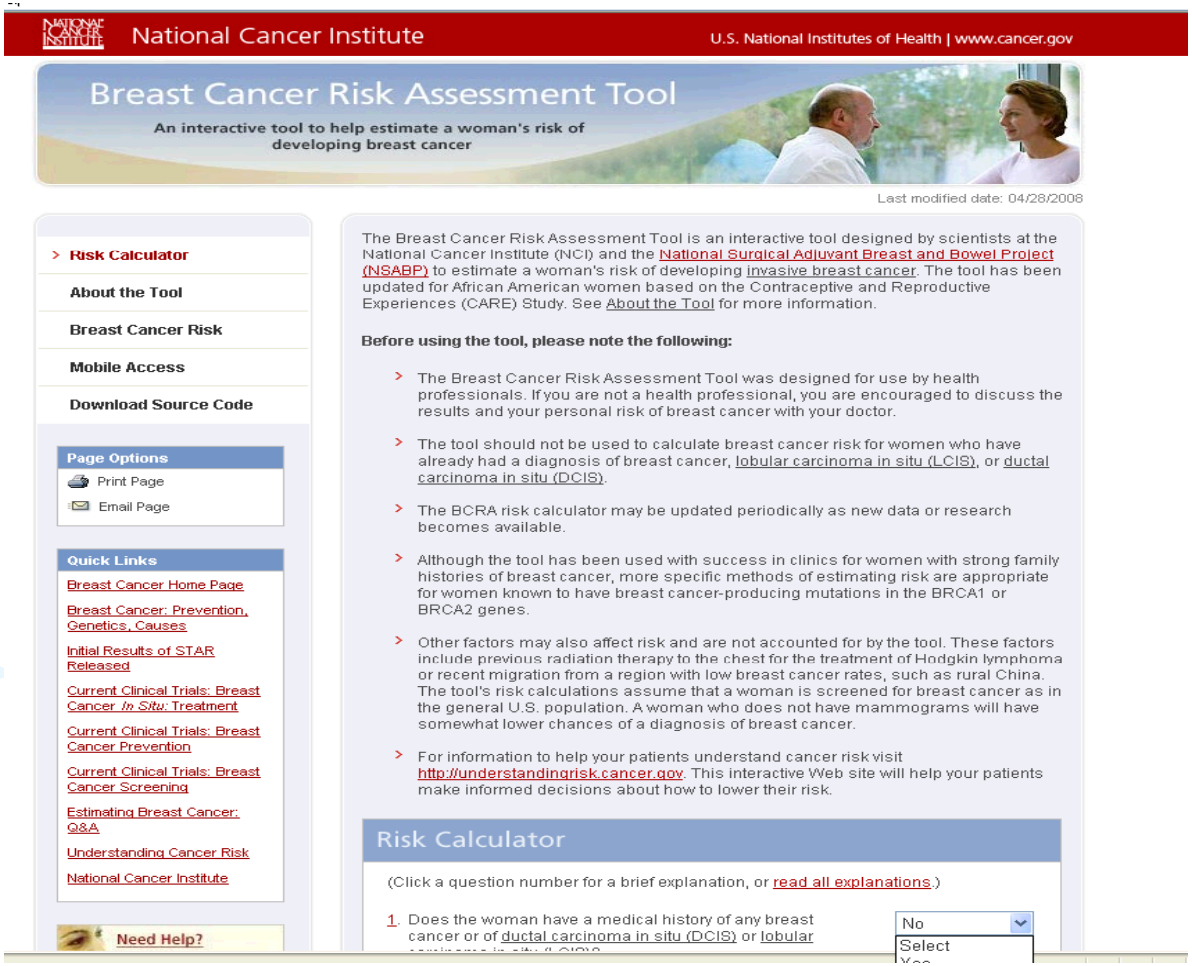
Br J Cancer. 2009 January 27; 100(2): 421–425.
Published online 2008 December 16. doi: 10.1038/sj.bjc.6604830.

Metcalfe, KA et al. Breast cancer risks in women with a family history of breast or ovarian cancer who have tested negative for a BRCA1 or BRCA2 mutation. Br J Cancer. 2009 Jan 27;100(2):421-5. Epub 2008 Dec 16

Assessing High vs. Average Risk

- Women treated with chest irradiation in childhood or young adulthood
- Women with multiple relatives with breast/ovarian cancer, or personal history suggestive of risk:
  - Young age at diagnosis
  - Bilateral breast cancer
  - Both ovarian and breast cancer
  - Multiple family cases of cancer (breast and ovarian)
  - Ashkenazi Jewish heritage

Breast Cancer Risk Assessment



What is her risk for breast cancer?

How can you help guide her decision?

- Personal values: Risk of false positive versus risk of failure to diagnose
  - Understanding of risks/benefits of screening mammography
  - Clarify understanding of personal risk
  - Assess personal values

Now versus later?
1 (wait) to 10 (screen now)

Per 1000 women screened every 2 years from age 40 to age 50:

- 740 correctly reassured
- 240 have “false alarms” with extra tests
- 9 women get cancer in between screenings found by symptoms
- 7 women have cancer detected by screening
- 0.5 women do not die from breast cancer

Australian Screening Mammography Decision Aid Trial
(http://www.mammogram.med.usyd.edu.au)

Screening Mammography Risk Assessment and Decision Guides

- **Australian Screening Mammography Decision Aid: http://www.mammogram.med.usyd.edu.au/**
- **Risk Assessment Algorithms www.QAP.sdsu.edu**
- **Gail Model www.cancer.gov/bcrisktool**

Mush for the Cure

Case History #2

M.H. is a 42 y.o. G1P1 Caucasian woman who comes in for a routine annual exam without any breast complaints and a normal clinical breast exam. Her family history: Daughter with ovarian cancer, 2 paternal aunts: one with breast and one with ovarian cancer, sister with known BRCA1 mutation. She has no Askenazi Jewish heritage.

Case #2 Questions

- Should M.H. be referred for genetic testing?
- What type of screening and prevention is available for women at high risk of breast cancer?

Genetic Testing

- U.S. Preventative Task Force recommends against routine referral for genetic counseling or routine breast cancer susceptibly gene (BRCA) testing. Grade D.
- USPSTF recommends that women whose family history is associated with an increased risk for BRCA1 or BRCA2 genes be referred for genetic counseling and evaluation for BRCA testing. Grade B

Recommendations from the United States Preventive Services Task Force on who should be offered genetic testing for BRCA mutations
•A family history of breast or ovarian cancer that includes a relative with a known deleterious BRCA mutation
For non-Ashkenazi Jewish women:
•Two first-degree relatives with breast cancer, one of whom was diagnosed at age 50 or younger
•A combination of three or more first or second-degree relatives with breast cancer regardless of age at diagnosis
•A combination of both breast and ovarian cancer among first and second-degree relatives
•A first-degree relative with bilateral breast cancer
•A combination of two or more first or second degree relatives with ovarian cancer, regardless of age at diagnosis
•A first or second-degree relative with both breast and ovarian cancer at any age
•History of breast cancer in a male relative
For women of Ashkenazi Jewish descent:
•Any first-degree relative (or two second degree relatives on the same side of the family) with breast or ovarian cancer

U.S. Preventive Services Task Force. Genetic risk assessment and BRCA mutation testing for breast and ovarian cancer susceptibility: recommendation statement. Ann Intern Med 2005; 143:355.

Assessing High vs. Average Risk

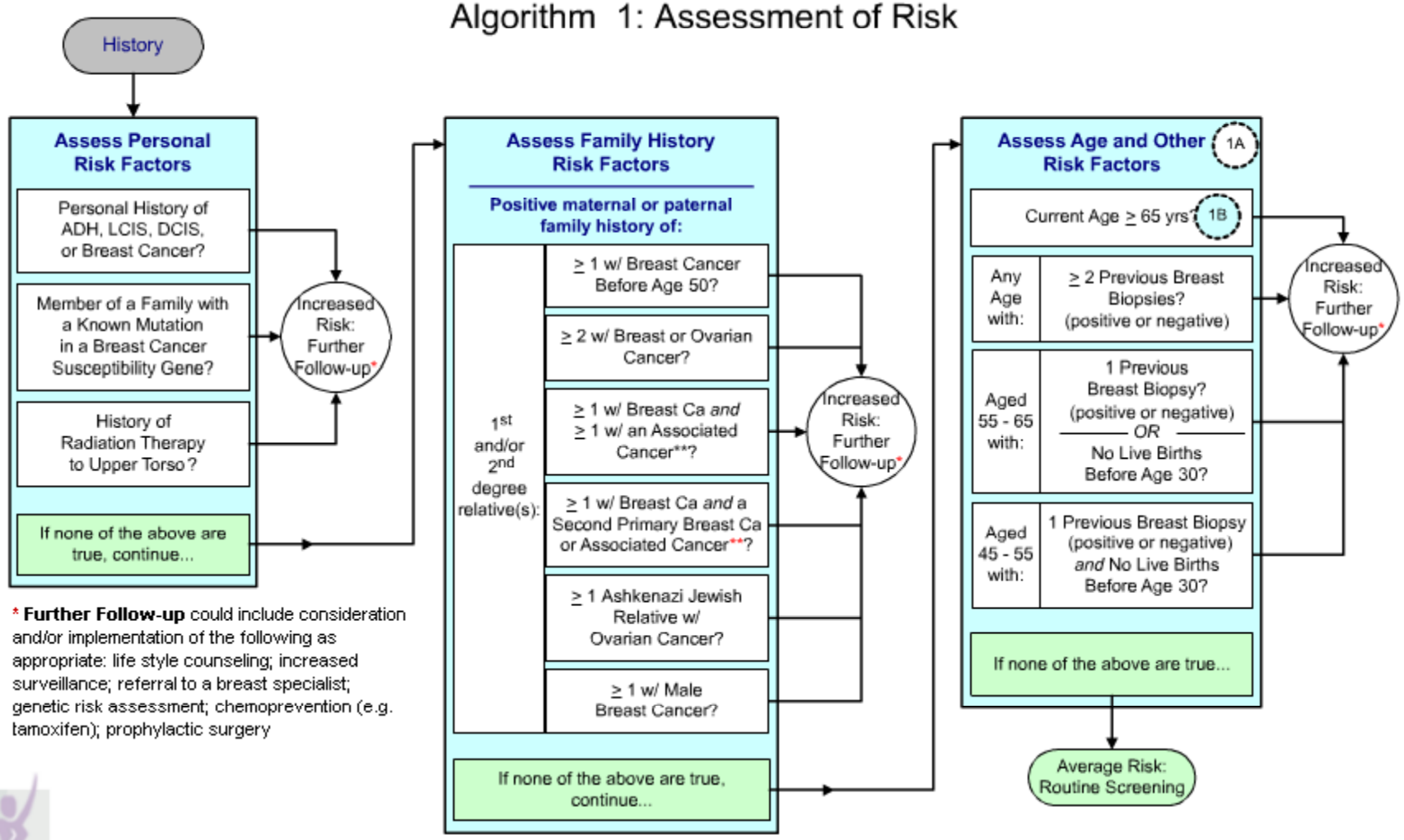
- Women treated with chest irradiation in childhood or young adulthood
- Women with multiple relatives with breast/ovarian cancer, or personal history suggestive of risk:
  - Young age at diagnosis
  - Bilateral breast cancer
  - Both ovarian and breast cancer
  - Multiple family cases of cancer (breast and ovarian)
  - Ashkenazi Jewish heritage

Models Assessing Risk

- BRCAPRO/Cancer Gene http://www4.utsouthwestern.edu/breasthealth/cagene/default.asp
- Claus Model (BreastCa for Palm available at www.palmgear.com)
- Tyrer-Cuzick (IBIS Breast Cancer Risk Evaluation Tool contact: ibis@cancer.org.uk).

Online Supplemental Material (CA Cancer J Clin 2007;57:75-89).

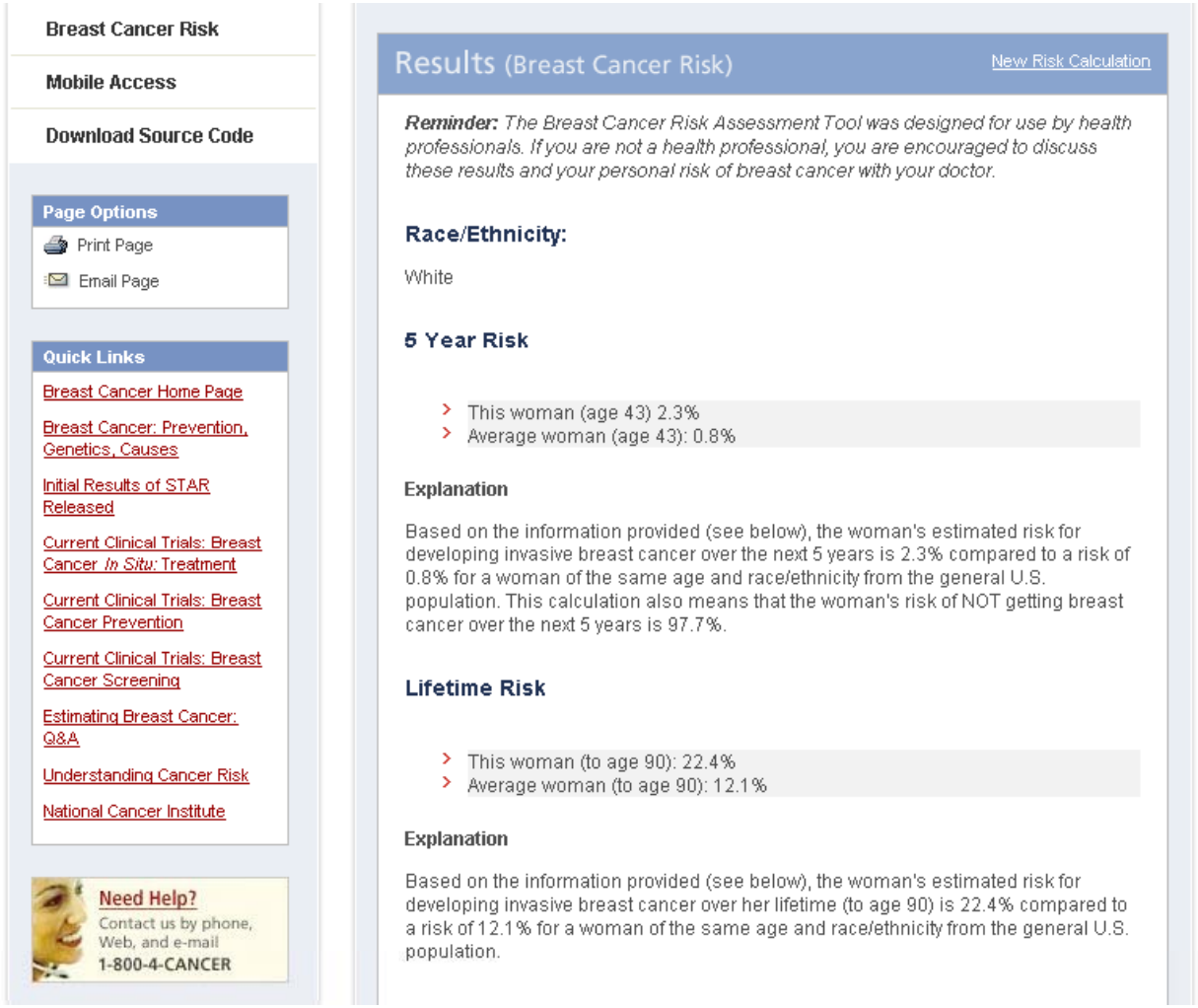
Algorithm 1: Assessment of Risk



* **Further Follow-up** could include consideration and/or implementation of the following as appropriate: life style counseling; increased surveillance; referral to a breast specialist; genetic risk assessment; chemoprevention (e.g. tamoxifen); prophylactic surgery

Associated cancers: ovarian; thyroid; colorectal; prostate; endometrial; pancreatic; adrenocortical; melanoma; childhood sarcoma; leukemia/lymphoma; brain tumor

Gail Model



Breast Cancer Risk

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Current Clinical Trials: Breast Cancer Screening

Estimating Breast Cancer: Q&A

Understanding Cancer Risk

National Cancer Institute

Need Help?

Contact us by phone, Web, and e-mail

1-800-4-CANCER

Results (Breast Cancer Risk)

New Risk Calculation

Reminder: *The Breast Cancer Risk Assessment Tool was designed for use by health professionals. If you are not a health professional, you are encouraged to discuss these results and your personal risk of breast cancer with your doctor.*

Race/Ethnicity:

White

5 Year Risk

- This woman (age 43) 2.3%
- Average woman (age 43): 0.8%

Explanation

Based on the information provided (see below), the woman's estimated risk for developing invasive breast cancer over the next 5 years is 2.3% compared to a risk of 0.8% for a woman of the same age and race/ethnicity from the general U.S. population. This calculation also means that the woman's risk of NOT getting breast cancer over the next 5 years is 97.7%.

Lifetime Risk

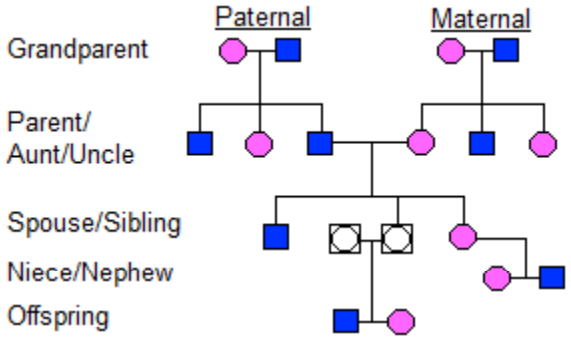
- This woman (to age 90): 22.4%
- Average woman (to age 90): 12.1%

Explanation

Based on the information provided (see below), the woman's estimated risk for developing invasive breast cancer over her lifetime (to age 90) is 22.4% compared to a risk of 12.1% for a woman of the same age and race/ethnicity from the general U.S. population.

CaGene5

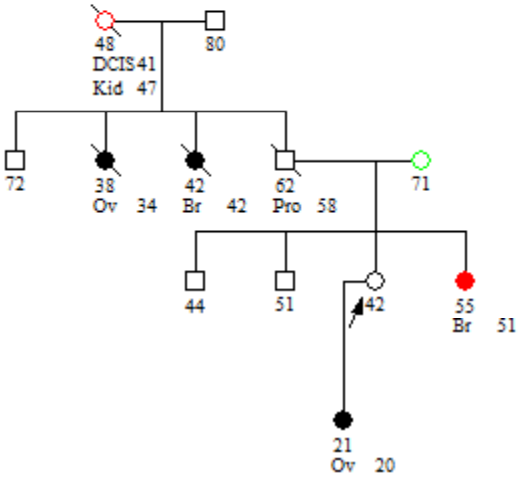
File Add Relative



? Shortcut Keys

DOE
11123
Ashkenazi: NO

Done | New Pedi
Change Proband | Print
Notation | Exit



BRCA Positive
BRCA Negative

CaGene5

File

8/30/2008

DOE
11123

Claus Family History Model

Print

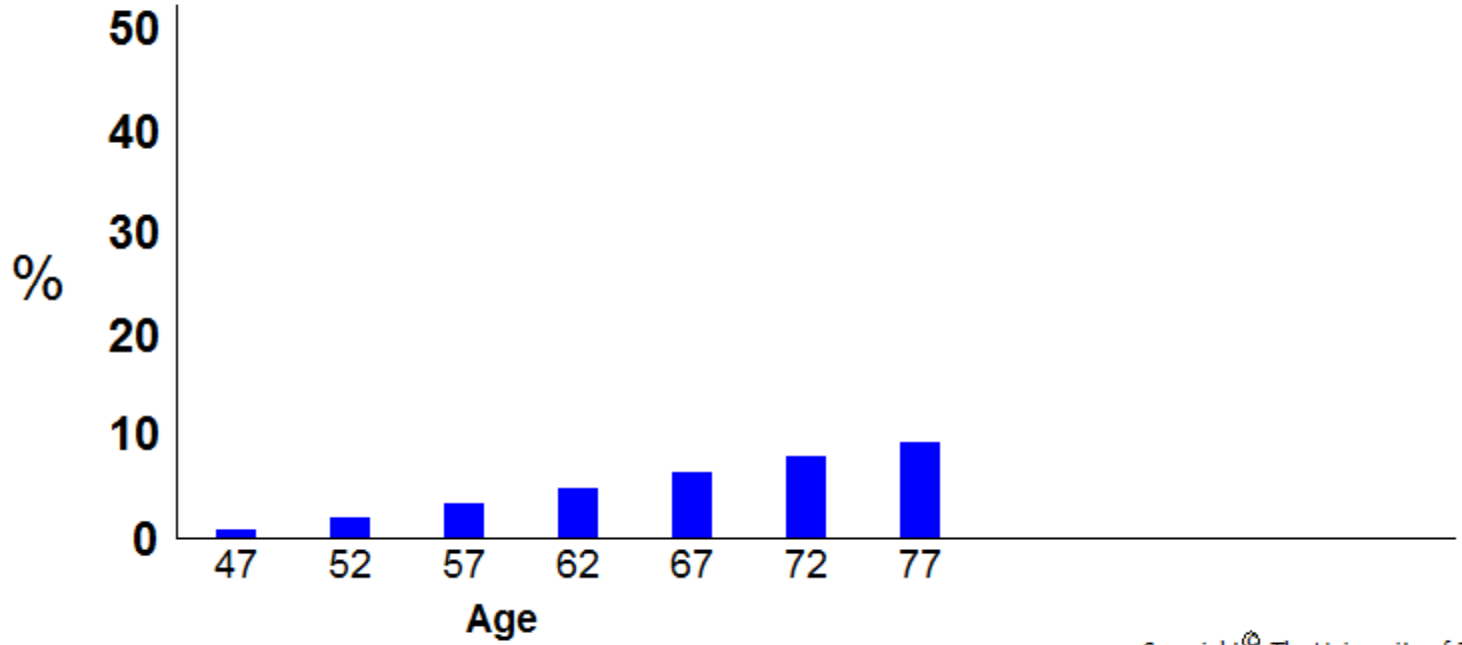
Quit

The Claus table used in this calculation is:

One first-degree relative

29	39	49	59	69	79
0.2	0.8	2.3	4.9	8.2	11.0

Probability of Developing Breast Cancer by Age



Remaining Risk

Age	%
47	.76
52	1.85
57	3.17
62	4.7
67	6.37
72	7.89
77	9.31

To Age 79: 9.9

CaGene5

File

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DOE
11123

BRCAPRO: BayesMendel

Print

Quit

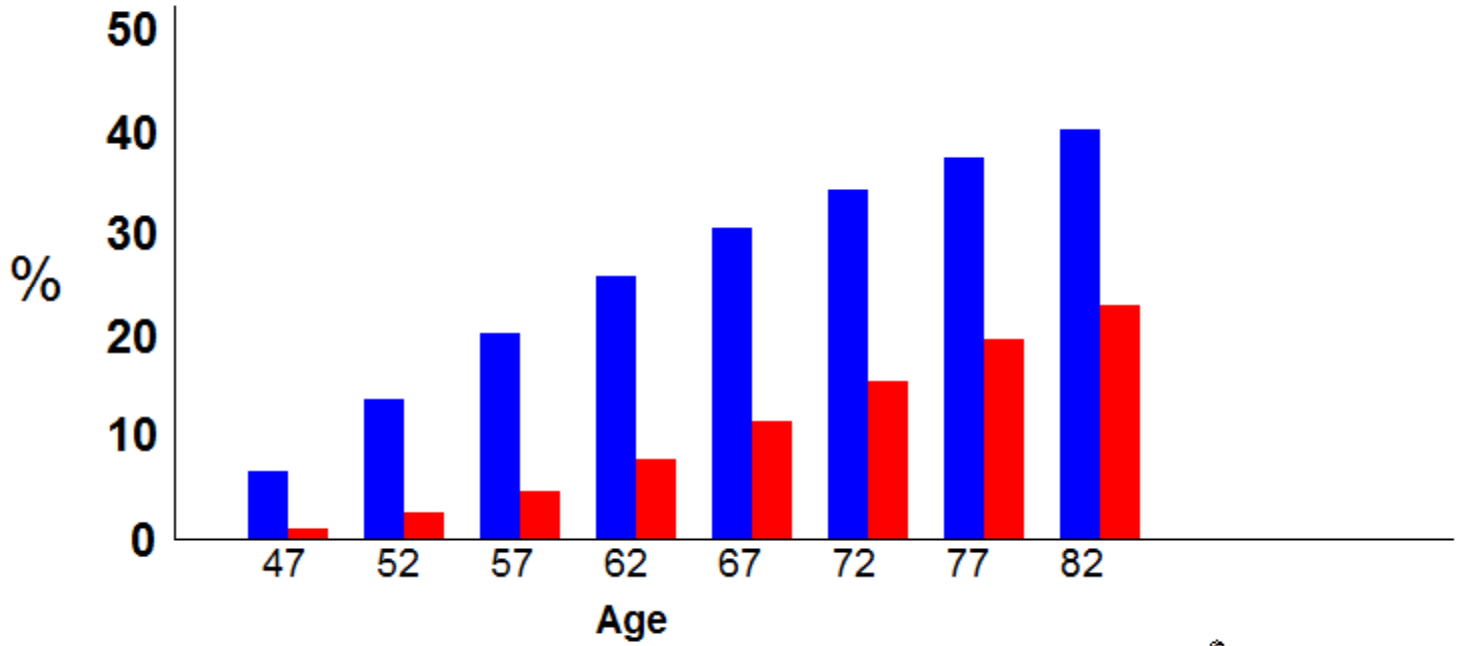
BRCApenet.metaDSL.2006

Carrier Probabilities

BRCA1: 0.021
BRCA2: 0.806
BRCA 1 or 2: 0.817

Age	Probabilities Breast	Ovarian
[47, 52]	[0.066, 0.135]	[0.009, 0.024]
52, 57]	0.135, 0.199]	0.024, 0.046]
57, 62]	0.199, 0.257]	0.046, 0.077]
62, 67]	0.257, 0.304]	0.077, 0.113]
67, 72]	0.304, 0.340]	0.113, 0.154]
72, 77]	0.340, 0.372]	0.154, 0.193]
77, 82]	0.372, 0.399]	0.193, 0.226]

Probability of Breast or Ovarian Cancer by Age



Risk Assessment in Women at High Risk of Breast Cancer

- Genetic Risk Assessment (Counseling/Testing)
- Interventions/Referral:
  - Adjunctive Screening/Surveillance
  - Chemoprevention
  - Prophylactic Surgery

Increased surveillance

- Yearly MRI in addition to mammography can be considered for women high risk(20-25% or greater lifetime risk using Claus of BRCApro)

Saslow D, et al. American Cancer Society guidelines for breast screening with MRI as an adjunct to mammography.
CA Cancer J Clin. 2007 Mar-Apr;57(2):75-89.

Chemoprevention

- **The U.S. Preventive Services Task Force (USPSTF) recommends against routine use of tamoxifen or raloxifene for the primary prevention of breast cancer in women at low or average risk for breast cancer.** Grade: D Recommendation.
- **The USPSTF recommends that clinicians discuss chemoprevention with women at high risk for breast cancer and at low risk for adverse effects of chemoprevention. Clinicians should inform patients of the potential benefits and harms of chemoprevention.**
  Grade: B Recommendation.

Chemoprevention

- Has been evaluated in women with a 1.5% or greater 5 year risk by the Gail Model and women at high risk of breast cancer
- Associated with thromboembolic events
- Of benefit to women in their 40's at high risk and without thromboembolic risks
- Of benefit to women in their 50's at high risk and without a uterus or thromboembolic risks
- Of more benefit to BRCA2 carriers than BRCA1 carriers

Prophylactic Surgery

- Prophylactic mastectomy can reduce breast cancer incidence by 85-100%
- Prophylactic oopherectomy can reduce risk for ovarian cancer by 85% or more and can reduce risk for breast cancer

Calderon-Margalit R, Paltiel O. Prevention of breast cancer in women who carry BRCA1 or BRCA2 mutations: a critical review of the literature. Int J Cancer. 2004 Nov 10;112(3):357-64.


Questions?