Mammograms and Breast Exams: When to start /stop mammograms? How good are physical exams?

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Doctor only line:

Table 1. Age-specific Incidence of invasive breast cancer (per 1,000 women per year); SEER data.[6]

Age Range	Incidence
35–39	.585
40–44	1.18
45–49	1.85
50–54	2.29
55–59	2.88
60–64	3.51
65–69	3.94
70–74	4.15
75–79	4.42
80–84	4.28
85+	3.42

A 3 % chance in her 40's of getting breast cancer
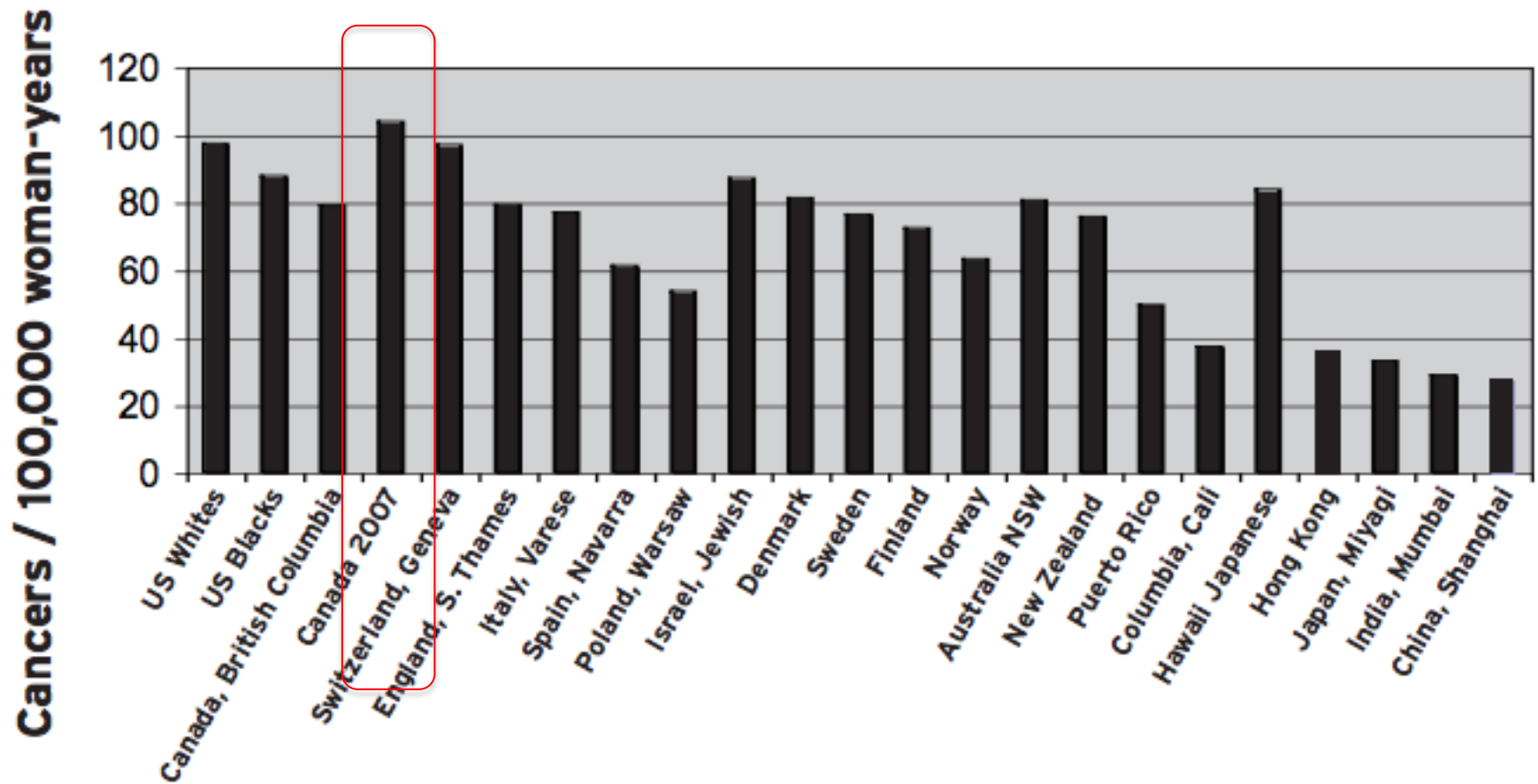
1.18 + 1.85 x 10 = 30/1000

Figure 1. Geographic variation in breast cancer incidence.[7] Data are for the period 1993 to 1997. Value for Canada 2007 from the Canadian Cancer Society.[8] Here, incidence is expressed in terms of the number of cancers per year per 100,000 women in the population.
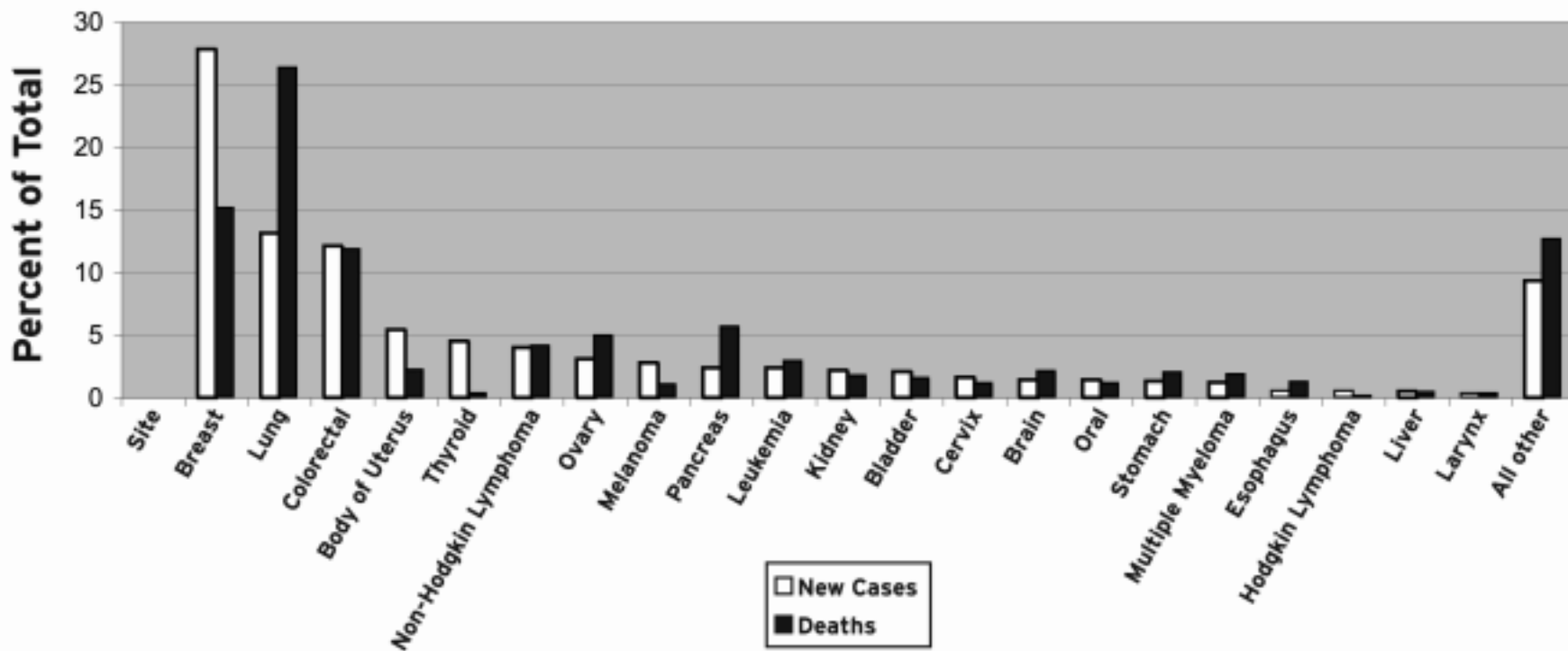
Figure 2. Distribution of new cases and deaths among cancer types. Canadian data.[8]

Canadian Task force for preventative health   2011

Guidelines

Recommendations on screening for breast cancer in average-risk women aged 40–74 years

The Canadian Task Force on Preventive Health Care

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Canadian Task Force on Preventive Health Care

Recommendations (Mammography)

For women aged 40–49 we recommend not routinely screening with mammography.

(Weak recommendation; moderate quality evidence)

For women aged 50–69 years we recommend routinely screening with mammography every 2 to 3 years.

(Weak recommendation; moderate quality evidence)

For women aged 70–74 we recommend routinely screening with mammography every 2 to 3 years.

(Weak recommendation; low quality evidence)

Clinical Breast Exam

INTERVENTION	RECOMMENDATION	RECOMMENDATION STRENGTH	BASIS OF RECOMMENDATION
Routine Clinical Breast Exam by a health professional	We recommend *not routinely performing* Clinical Breast Exam alone or in conjunction with mammography to screen for breast cancer.	Weak recommendation; low quality evidence	No evidence was found indicating that Clinical Breast Exam or Breast Self Exam reduced breast cancer mortality or all-cause mortality. Two large trials identified no reduction in breast cancer mortality associated with teaching Breast Self Exam to women aged 31 to 64, but found evidence of increased harm for benign breast biopsy.

Canadian Task Force on Preventive Health Care

Current Canadian recommendations

- Don't do routine screening breast exams
- Mammograms age 50 - 74

Physical Exam

The importance of physical exam ; you don't want to miss this.

LET'S EXAMINE THE EVIDENCE

Physical Exam

Regular self-examination or clinical examination for early detection of breast cancer (Review)

Kösters JP, Gøtzsche PC

THE COCHRANE COLLABORATION®

22 April 2003

Cochrane review

Two large population-based studies (388,535 women) from Russia and Shanghai that compared breast self-examination with no intervention were included. There was no statistically significant difference in breast cancer mortality between the groups (relative risk 1.05, 95% confidence interval (CI) 0.90 to 1.24; 587 deaths in total). In Russia, more cancers were found in the breast self-examination group than in the control group (relative risk 1.24, 95% CI 1.09 to 1.41) while this was not the case in Shanghai (relative risk 0.97, 95% CI 0.88 to 1.06). Almost twice as many biopsies (3406) with benign results were performed in the screening groups compared to the control groups (1856) (relative risk 1.88, 95% CI 1.77 to 1.99). One large population-based trial of clinical breast examination combined with breast self-examination was also included. The intervention was discontinued because of poor compliance with follow up and no conclusions could be drawn.

Breast exam: self or from clinical staff did not benefit the patient. No improvement in mortality.

Is it possible in 2003 that there were limited resources in China and Russia to treat advanced breast cancer? We know that physical exam identifies later stage disease.   Could the size of the breasts influenced outcomes? Will a woman self identify faster with a smaller breast?

Physical Examination. Its role as a single screening modality in the Canadian national breast screening study Cancer May 1989, Cancer Baines et al

- 50% screened <u>only with PE</u>
- 19,965 women
- Each woman had 5 PE's
- Sensitivity : 71 to 83%
- Specificity: 88 – 96%
- Age 40 – 49 :
  - Sensitivity : 71%
  - Specificity : 84%

- **Conclusion: Physical exam has benefit if patient not undergoing routine imaging**

Comparison of the Performance of Screening Mammography, Physical Examination, and Breast US and Evaluation of Factors that Influence Them: An Analysis of 27,825 Patient Evaluations

RSNA Radiology.   Kolb et al. New York

- 11,130 asymptomatic women underwent mammogram and subsequent physical exam (PE) - a total of 27,825 screenings
- Dense breasts also had US
- 221 women and 246 cancers were identified
- Results:

Mammograms miss at least 25% of breast cancers

Test	Sensitivity (%)	Specificity (%)	Negative predictive Value (%)	Positive predictive value (%)	Accuracy (%)
Mammogram	77.6	98.8	99.8	35.8	98.6
PE	27.6	99.4	99.4	28.9	98.8
US	Increased number of non-palpable breast cancers identified by 42% in dense breasts (30 of 71)				

Comparison of the Performance of Screening Mammography, Physical Examination, and Breast US and Evaluation of Factors that Influence Them: An Analysis of 27,825 Patient Evaluations

- Mammographic sensitivity declined with density of breast (p<0.1) 48% for densest breasts and in younger women with dense breasts p=0.2

- Mammogram and US together had a significantly higher sensitivity (97%) than mammogram and PE (74%) p<0.001)

- Tumors detected by mammogram and/ or US were significantly smaller (p=0.1) and lower stage p=0.1) than those detected by PE

Earlier Detection and Diagnosis of Breast Cancer:

{ Recommendations and Scientific Review from It's About Time! A Consensus Conference }

Canadian Breast Cancer Foundation - Ontario Region

Earlier Detection and Diagnosis of Breast Cancer:
A Report from It's About Time! A Consensus Conference

Amended October 13, 2010

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https://www.cbcf.org/central/AboutBreastHealth/PreventionRiskReduction/Documents/CBCF+-+IAT+Scientific+Report+-+Final[1].pdf

Average risk

- No genetic abnormality
- No radiotherapy
- No genetic mutations
- No LCIS
- 5 yr risk of breast cancer < 1.7% using www.cancer.gov/bcrisktool/Default/aspx
- Lifetime risk < 15%

Age 40 – 49 mammograms (average risk)

Canadian Task Force on Preventive Health Care

- No routine screening
- Number needed to treat to prevent a single death = 2,108 (vs. 721 in older)
- Increase false positives
- Put very low value on very small absolute decrease in mortality, concerns re: false positive
- Should decide based on the values of the patient

Earlier Detection and Diagnosis of Breast Cancer:

{ Recommendations and Scientific Review from It's About Time! A Consensus Conference }

- Start screening every 1 - 2 years at age 40 until menopause; annually if dense breasts
- Continue until have a 10 year life expectancy

2011

How do we guide our patients when the decision is value based?

Age 40 – 49 mammograms (average risk

Canadian Task Force on Preventive Health Care

- Have to screen 2108 women every 2 years for 11 years to prevent one death from breast cancer, would also have 690 (32%) false positive biopsies; 5 /1000 will have an unnecessary lumpectomy or mastectomy
- In the 60 – 69 age group: would have to screen 721 to prevent one death; false positive rate is smaller : 204 (28%)

Age 70 – 74

- Screen fit women

- Continue until have a 10 year life expectancy

Earlier Detection
and Diagnosis of Breast Cancer:

{ Recommendations and Scientific Review from
It's About Time! A Consensus Conference }

75 years and older

- No evidence that screening will benefit this patient population

- Small absolute reduction in mortality

Changes in the age structure of the population

1971, Population: 22.0 million   2011, Population: 34.5 million   2030, Population: 41.7 million
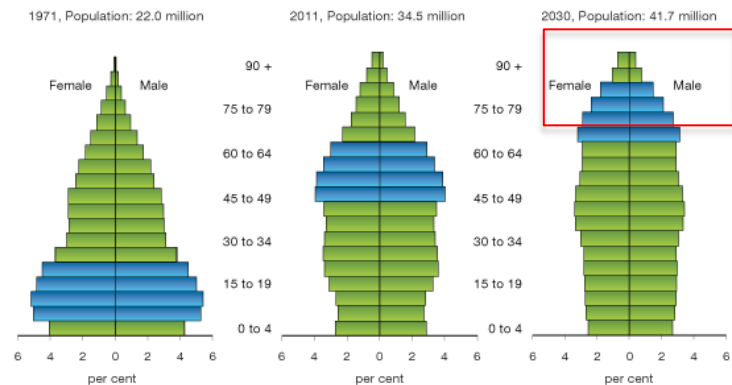
Source: Statistics Canada.

Canadian Task Force
on Preventive Health Care

This will become an increasingly important issue.

- *In today's world, we are aggressively treating people in this age group and older – they receive chemotherapy if they would benefit*

- *They are more likely to be estrogen receptor positive and so will benefit from hormonal therapy*

- *WRCP 17% <u>triple negative breast</u> cancer are 70 years or older; 30% of them would likely get chemo*

- *<u>Her 2 positive</u> breast cancer 20% of patient population – would all be offered a chemotherapy that they would tolerate*

Increased sensitivity of mammogram 1996-2006

Table 4. Performance measures for 3,603,832 screening mammography examinations from 1996 to 2006 by age.[21]

	Sensitivity (%)	Specificity (%)	PPV (%)	Recall(%)
Overall	80.2	91.4	4.3	8.9
Age 40–49	70.8	89.8	1.5	10.3
45–49	74.3	89.8	2.3	10.3
50–54	78.4	90.9	3.3	9.2
55–59	81.6	91.5	4.6	8.8
60–64	80.0	91.9	5.4	8.4
65–69	82.5	92.4	6.3	8.0
70–74	82.9	93.1	7.9	7.3
75–79	84.5	93.6	9.8	6.9

- Specificity of 91.4% indicates that 91.4% of those women screened who do not have breast cancer will be told they do not have breast cancer.
- 8.6% will be asked for more assessment but will not have cancer.

- Sensitivity means that it correctly identifies 80.2% of women that have breast cancer, but incorrectly misses 19.8%

Table 6. Characteristics of mammography and CBE detection in ten years of OBSP screening (from Chiarelli et al.[37])

Criterion	Mammography Only	CBE Only
Invasive cancer detection rate (per 1,000) - Initial Screen	3.3	0.3
Re-screen	2.6	0.3
In situ cancer detection rate (per 1,000) - Initial Screen	0.8	0.1
Re-screen	0.7	0.0
Positive predictive value (%) - Initial Screen	5.0	0.7
Re-screen	7.0	1.0
Benign to malignant surgical biopsy ratio - Initial Screen	1.7 : 1	9.9 : 1
Re-screen	0.9 : 1	6.1 : 1
Tumour size £ 10 mm (%) - All Screens	53.2	27.2
Positive lymph nodes (%) - All Screens	16.8	34.4
Diagnostic interval (% diagnoses completed within 7 weeks if surgical biopsy) - All screens	48.4	35.7

very few cancers were detectible by CBE alone, and these tended to be larger and less likely to be node negative than those detectible by mammography alone. In addition, the positive predictive value (related to specificity) was much lower for CBE, and many more negative biopsies were carried out on the basis of CBE-only findings. The study by Bancej et al.[50] had similar conclusions.

The OBSP study concluded that women should be informed of the risk and benefits of having a CBE in addition to mammography for breast screening. If CBE is offered as a screening test, standards for training, performance and tracking should be established as for mammography.

Clinical Breast Examination in addition to mammography does not decrease breast cancer mortality beyond the use of mammography alone

BUT have to balance this with a sensitivity of mammography of 77% - it misses 23% of breast cancers.

If CBE is added to mammography   4/10,000 extra cancers would be ID'd (OBSP data)

Appendix 5: The Contribution of Clinical Breast Examination (CBE) to Breast Cancer Screening

There have been two published meta-analyses of randomized control trials of CBE: Kerlikowske et al.[48] in 1995 and Humphrey et al.[33] in 2002. These found that CBE in addition to mammography did not decrease breast cancer mortality beyond the reduction achieved by mammography alone. There have also been several observational studies of the performance of CBE in service screening.[49,50,51] Typically, these found that in women 50-69 years of age, the contribution to breast cancer detection from CBE alone ranged from 2.5-4 additional cancers per 10,000 examinations, about 10% of the detection rate achievable by mammography alone. In addition, the sensitivity of CBE is low (see Table 7). Chiarelli[51] compared the accuracy of screening among Ontario Breast Screening Program (OBSP) centres that offered CBE and mammography with centres that offered mammography alone in 290,230 women. Her study found that standardized CBE provided by highly trained nurses resulted in a higher CBE sensitivity of 32-47% on initial screens and 26-27% on rescreens. She observed that in the OBSP context, the addition of CBE would lead to the detection of breast cancer in only 4 women in 10,000 screens and lead to false positive results for an additional 219 women.

Table 7. Performance of CBE in a community setting. Age range studied is shown in parentheses.

Authors	Sensitivity	Specificity
Bobo et al.[49] (n=589,048)	36.1% (≥40)	96.2% (≥40)
Oestreicher et al.[52] (n=61,688)	20.0-22.8% (40-49)	97.4-98.6% (40-49)
	19.4-24.7% (50-69)	96.9-98.3% (50-69)
Kolb et al.[53] (n=11,130)	27.6% (≥40)	99.4% (≥40)
Fenton et al. 2005[54] (n=485) 2007[55] (n=1,427)	21.6% (40-65)	99.4% (40-65)
Chiarelli et al.[51] 2009 (n=290,23)	32-47% (initial, 50-69)	96% (initial, 50-69)
	26-27% (rescreen, 50-69)	97-98% (rescreen, 50-69)

Physical exam is not sensitive, but it is specific in these studies.
Finds only about 19% - 47% of cancers (sensitivity)

1998 (Canada) – CBE and Mammogram recommended for women aged 50 – 69
  * really no evidence so this made sense

2002 (US) – Mammogram +/- CBE age 40 and older – no real evidence

2002 (International) no evidence that CBE is beneficial, but will help in countries that don't have mammogram

In its 1998 report, The Canadian Task Force on Preventive Health Care[57] recommended that women aged 50 to 69 years undergo screening for breast cancer by mammography and clinical breast examination every one to two years. Their rationale for this recommendation was that the relative contributions of mammography and CBE had not been ascertained. The 2002 recommendations of the U.S. Preventive Services Task Force take a rather different perspective. They recommend screening mammography, with or without CBE, every one to two years for women aged 40 or older. Their reasoning is that at that time they could not determine whether the potential benefits of routine CBE outweighed the potential harms, nor did they have adequate evidence on the incremental benefit of adding CBE to mammography. In 2002, the International Agency for Research on Cancer (IARC) stated that there is inadequate evidence that breast screening with CBE, either alone or in addition to mammography, can reduce mortality from breast cancer.[58] The IARC do suggest, however, that CBE may be important in countries where there are insufficient resources for mammography or where disease is usually at an advanced stage at the time of diagnosis.

Appendix 8: U.S. Preventive Services Task Force (USPSTF) Screening for Breast Cancer Recommendation Statement

This report, which was issued in 2009, reverses several of the recommendations published by the same task force in 2002. This is surprising, because in some cases no new scientific evidence supported a change of recommendations, while in others there was new evidence to support the existing policy in the U.S., but that evidence was ignored by the committee. Because some of the new recommendations disagree with the recommendations presented in this document, some discussion is justified.

1. Contrary to its 2002 recommendations,[33] the 2009 USPSTF report recommends against routine screening mammography of women in their 40s. However, as discussed in Appendix 2, data from randomized trials and observational studies of mammography screening in the real world (Sweden and British Columbia) demonstrate a breast cancer mortality reduction of 25-45% in women whose breast cancers were detected by mammography screening in their 40s. Similarly, in the Netherlands, the death rate in health care districts continued to rise despite the introduction of new therapies, and only when screening was introduced did the death rates begin to decline. These data have been ignored in the current report and, based on meta-analysis of all RCTS, the USPSTF has chosen instead to emphasize an artificially low value of 15% mortality reduction attributable to mammography screening. The USPSTF also concluded that the NNI to save one life (n=1904) was unreasonably high for the small benefit estimated by meta-analysis. However, NNI as a measure of cost-effectiveness not only is an imprecise concept due to the fact that it obscures the actual screening rate, but is especially imprecise when derived from eight RCTs with different rates of adherence to the randomization assignment and different years of follow-up. This is not a trivial issue, since these methodological decisions led to the elimination of a recommendation for screening for women in their forties. In fact, when the more proper estimate of benefit, i.e., number needed to screen (NNS) is estimated for women aged 40-49 from a single population, the NNS 5-6 times over a 10 year period to prevent one breast cancer death after 20 years of follow-up was estimated to be 726, less than half the number estimated by the USPSTF.[34]

2. The USPSTF report also indicates that "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." While all decisions of this sort are individual, and patients deserve to be given factual information regarding benefits, limitations and possible harms of any procedure, this recommendation is not particularly useful in that the main risk factor for breast cancer is being a female over 40 years of age. While there are other well-established risk factors for breast cancer, most breast cancers occur in women without those factors. Furthermore, it is widely accepted that because of the faster growth rate of cancers in younger women, if screening is to be performed in women in their 40s, it should be done annually.

Public opinion
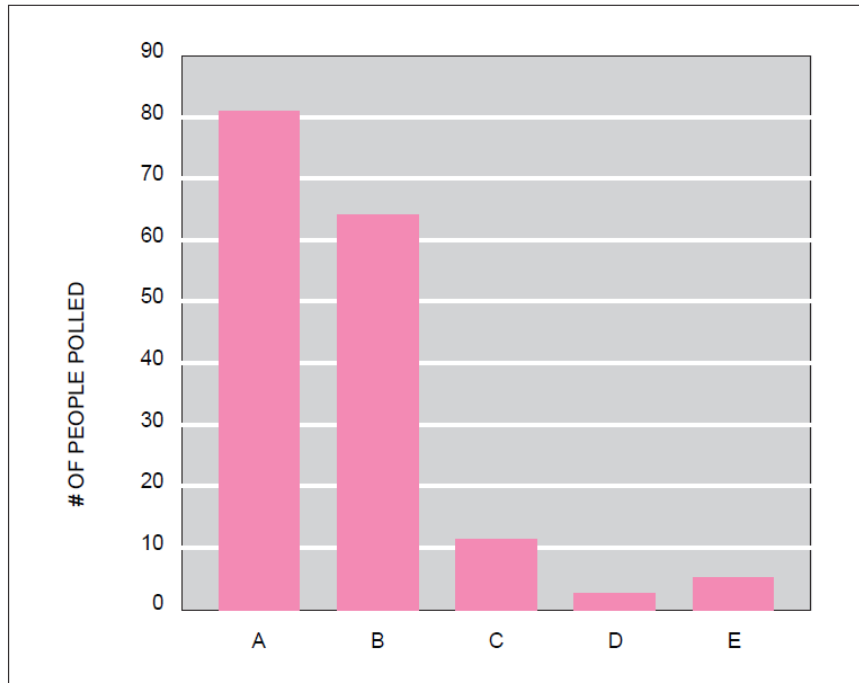
Public opinion poll:

In your opinion, do the benefits of breast cancer screening women 40 - 49 outweigh the limitations and risks?

Response:

A   Much more benefit than risk 49%

B   More benefit than risk 39%

C   Equal benefit and risk 8%

D   More risk than benefit 2%

E   Much more risk than benefit 2%

Favors mammogram age 40 - 49

Summary

- Breast exams – little evidence of benefit, but if patient not going to routine mammography, should examine them

- In centres that have mammograms, patients present with earlier stage, and more easily treated breast cancer

- Mammograms cannot identify 20% of breast cancers – "mammographically occult"

Summary

- Mammograms in the 40s will increase number of unnecessary biopsies ;
  - 3% of people in their 40's will get breast cancer
  - 0.5% of women in their 40's who get screened will have an unnecessary surgery
  - 20% of our breast cancer patients are < age 50
  - have to screen 3 x the number of people in their 40s to get the same benefit as those in their 50s and 60s
  - Are more likely to have triple negative breast cancer and need chemotherapy

Summary

- Women aged 50 – 69 should be screened
- Screening outside of these ages is based on values
- Need better screening tools
  - No evidence for MRI in average risk women
  - Mammograms hurt

Ethiopia
one breast cancer per month with a catchment of 2 million

EXTRA SLIDES (HIGH RISK)

High Risk

Women at high risk include those who have the following:
- A history of radiation treatment to the chest
- Genetic mutations, including an abnormality in the BRCA 1 or BRCA 2 genes, Li-Fraumeni Syndrome, CDH1, Cowden's Syndrome or Bannayan-Riley-Ruvalcaba Syndrome
- A history of lobular carcinoma in situ
- Five-year risk of breast cancer 1.7% or greater at age 35 or older, as defined by a Gail Model calculation. A risk calculator based on this model is available at www.cancer.gov/bcrisktool/Default.aspx.
- A lifetime risk of breast cancer 25% or greater, as defined by models dependent on family history.

Published Breast MRI Screening Study Results

	The Netherlands	Canada	United Kingdom	Germany	United States	Italy
No. of centers	6	1	22	1	13	9
No. of women	1,909	236	649	529	3909	105
Age Range	25 - 70	25 - 65	35 - 49	30	25	25
No. of cancers	50	22	35	43	4	8
Sensitivity (%)						
MRI	80	77	77	91	100	100
Mammogram	33	36	40	33	25	16
Ultrasound	n/a	33	n/a	40	n/a	16
Specificity (%)						
MRI	90	95	81	97	95	99
Mammogram	95	>99	93	97	98	0
Ultrasound	n/a	96	n/a	91	n/a	0

n/a = not applicable.

High Risk Women
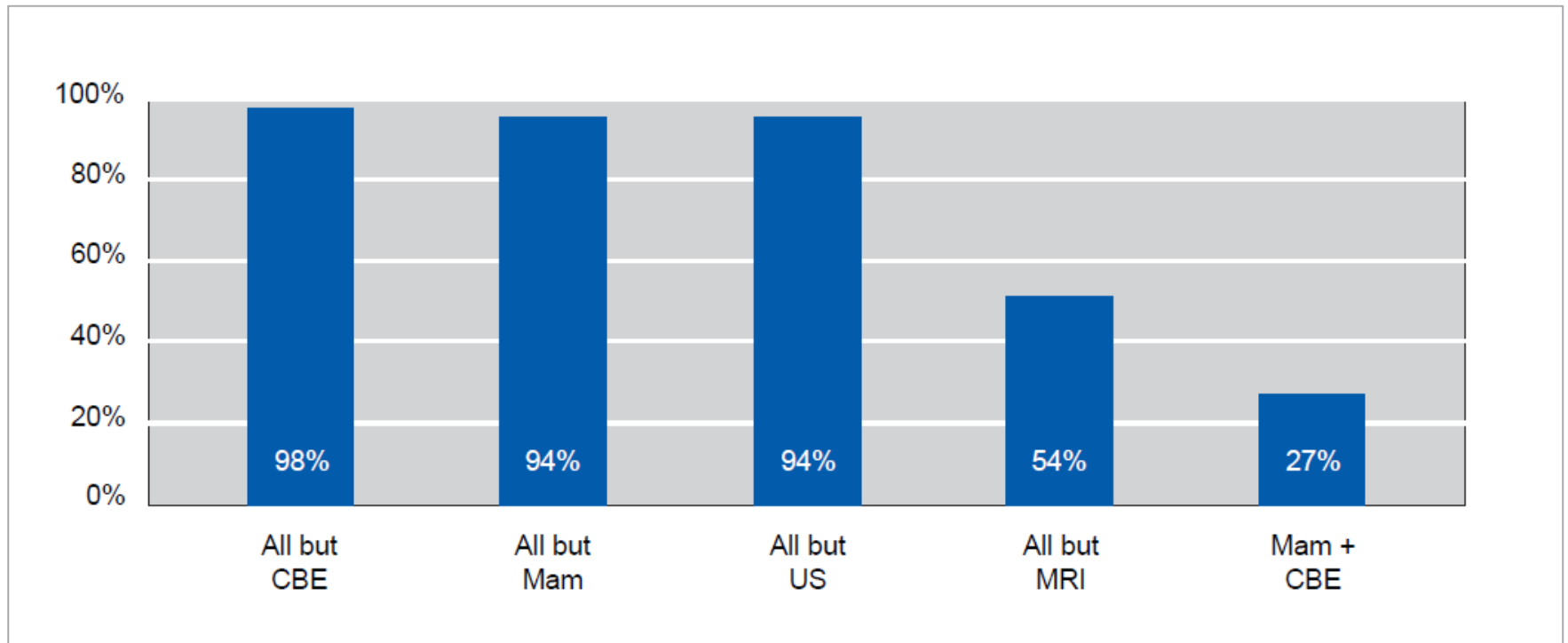
98% of the cancers were found by one of the screening modalities but, without MRI, almost half of the cancers would have been missed