Walter LC, Schonberg MA. Screening mammography in older women: a review. *JAMA*. doi:10.1001/jama.2014.2834

**eAppendix 1.** Search #1 Strategy  
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**eBox.** Decision Aids about Cancer Screening in Older Adults

This supplementary material has been provided by the authors to give readers additional information about their work.
eAppendix 1. Search #1 Strategy

We performed a systematic review of PubMed for breast cancer risk factors for older women. MeSH terms: “breast neoplasms” and “risk factors” and “older women” and “65+.” We limited our search to clinical trials, meta-analyses, multicenter studies, observational studies, randomized controlled trials, reviews, or systematic reviews written in English about female humans. We searched articles from 1/1/1990 to 2/1/2014. Our search strategy resulted in 864 articles. Dr. Schonberg reviewed all titles. We included studies on reproductive risk factors (age at first menarche, age at first birth, age at menopause, number of months breastfeeding, parity), family history of breast cancer, smoking, alcohol use, obesity/weight/body size, physical activity, bone density, and breast density that provided data on women aged 65 and older. We excluded studies that only examined the effect of hormone replacement therapy on breast cancer risk because this risk factor was examined in a large randomized controlled trial, the Women’s Health Initiative (WHI), and we reported the results of the WHI instead. We also excluded studies that did not provide a relative risk, odds ratio, or hazard ratio for developing breast cancer. We repeated our search using the same criteria as above but adding each risk factor of interest (reproductive factors [n=70], family history [n=113], obesity [n=45], physical activity [n=32], smoking [n=60], alcohol [n=33], bone density [n=34], and breast density [n=67]). In addition, Dr. Schonberg reviewed the 888 citations related to Sweeney et al. since this manuscript described the one large prospective study examining risk factors for breast cancer among women aged 75 and older. Overall, only four manuscripts provided data for women aged 75 and older and two of the four manuscripts used data from the same prospective study. Therefore, we decided to include the 24 manuscripts that provided data on risk factors for breast cancer for women at least 65 years and older, which are included in Table 2.
eAppendix 2. Search #2 Strategy

We performed a systematic review of PubMed for benefits and harms of mammography screening in women aged 75 years and older. MeSH terms: “breast neoplasms” and “mammography” and “risk assessment” and “older women” and “65+.” We limited our search to clinical trials, meta-analyses, multicenter studies, observational studies (e.g., longitudinal, retrospective, case-control studies), randomized trials, reviews or systematic reviews written in English about female humans. We searched articles from 1/1/1990 to 2/1/2014. Our search strategy resulted in 2,121 articles. Dr. Walter reviewed all titles. We included studies about breast cancer mortality following screening mammography as well as studies on unnecessary procedures, harm, risks, benefit, adverse effects, false-positives and biopsies following screening mammography. We excluded studies that did not report outcome data specifically for women 75 and older, because this is the age group where guidelines suggest individualized screening decisions. Articles not appearing in the search but referenced by review articles were also evaluated. We include in Table 4 the 13 manuscripts that provided data on survival benefits and/or false-positives and biopsies following mammography specifically for women 75 and older. For data on the psychological consequences of false-positive mammograms and estimates of overdiagnosis we refer to recent reviews on these topics. Cost-effectiveness studies are described in the text of the article rather than in Table 4.
eAppendix 3. Calculations for Figure 1

Figure 1 is calculated from the 2008 Life Tables of the United States. Quartiles were calculated from the data provided in the column titled, “number surviving to age x” based on the same methods used to create the Figure in the 2001 JAMA article by Dr. Walter (Reference #18). Below we use the example of women at age 70 to demonstrate the steps used to calculate each life expectancy quartile for each age-gender subgroup in Figure 1.

For example, using data from the 2008 Life Table for Females in the United States (Reference #19), at age 70 this table shows that 82,039 women survived until age 70 years. The top 25th percentile for 70-year-old women can be calculated by determining the age at which 75% of these women have died (i.e., beyond which 25% of 70-year-old women lived)

1) 75% of 82,039 is 61,529 and 82,039-61,529=20,510

2) The column “number surviving to age x” indicates that 20,510 women would still be alive until age 92. Interpolation provides the exact age.

3) Therefore, only 25% of 70-year-old women will live 22 years or more (92 years – 70 years = 22 years) and therefore 22 years is the top 25th percentile of life expectancy for 70 year-old women in Figure 1.

These same steps were repeated for each age, gender and life expectancy quartile to calculate the numbers in Figure 1. Calculations for men are based on the 2008 Life Table for Males in the United States.
### eTable. Pros and Cons of Getting a Screening Mammogram

<table>
<thead>
<tr>
<th>Pros</th>
<th>Cons</th>
</tr>
</thead>
<tbody>
<tr>
<td>A mammogram is more likely to find breast cancer when it is small, improving an older woman’s chances of only needing a minor surgery.</td>
<td>A mammogram may find a breast cancer that would never have caused problems or symptoms in a woman’s lifetime.</td>
</tr>
<tr>
<td>Getting a mammogram may lower an older woman’s chances of dying from breast cancer.</td>
<td>Getting a mammogram may result in older women getting additional tests (for example, additional mammograms, ultrasounds, and breast biopsies) or treatments. Some of these tests or treatments may cause harm.</td>
</tr>
<tr>
<td>Getting a mammogram may help an older woman feel good about her health.</td>
<td>Getting a mammogram may be uncomfortable for an older woman or cause anxiety.</td>
</tr>
</tbody>
</table>
eBox. Decision Aids about Cancer Screening in Older Adults

1. **A Mammography Decision Aid for Women > 75 years:**

   This decision aid is designed to help women > 75 years understand the entire screening process in order to improve decision-making. The decision aid includes information on late-life breast cancer risk, likely outcomes if screened or not screened after age 75, and breast cancer treatment options. In addition, the decision aid asks older women to consider their health and life expectancy when making screening decisions. It has been evaluated in a pre-test/post-test trial, which suggests the decision aid improved older women's decision-making.


   The decision aid is also available by request from Dr. Mara Schonberg (mschonbe@bidmc.harvard.edu).

2. **A Mammography Decision Aid for Women Aged 70 Years:**

   This decision aid was designed to help women at age 70 years decide whether or not to continue mammography screening. A large randomized controlled trial of 734 Australian women found that women who used the decision aid were more informed and better able to make an informed choice about whether or not to continue mammography screening.
**eBox. Decision Aids about Cancer Screening in Older Adults**

**Reference:** Mathieu E, Barratt A, Davey HM, McGeechan K, Howard K, Houssami N.


The decision aid is available at:


**3. ePrognosis Cancer Screening App for iPhones and iPads:**

This decision aid uses prognostic information about older adults to help clinicians and older adults decide if cancer screening is likely to be more beneficial or harmful. The app assesses patient age, gender, body mass index, symptoms, and functional impairment to calculate a mortality risk to help determine if a patient is likely to live > 5-10 years.


This app can be downloaded for free on iTunes -


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