Should breast and colorectal cancer screening be carried out in older adults?

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Disclosures

• No conflicts of interest to disclose
The debate on whether or not there was life after death turned out to be extremely one-sided.
General considerations for cancer screening in older adults

• Screening asymptomatic individuals to detect early cancers which may be curable
• Use diagnostic tests with high sensitivity
• Natural history of disease can be changed by intervention
• Benefits outweigh risks
Benefits of screening

- Picks up early stage, curable disease
- Prolonged survival
- Better quality of life
- Self-empowerment
- *Often* economically attractive
Harms of screening

- Anxiety surrounding diagnosis/work-up
- Labelling phenomenon
- Procedural risks
- False positives/false negatives
- Identifying clinically insignificant lesions (e.g. DCIS, Gleason 6 prostate cancer)
- Economic considerations
# Cancer screening guidelines

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<tbody>
<tr>
<td><strong>Breast</strong></td>
<td>Mammogram yearly after age 45, every 2 y after 55 until &lt;10 y life expectancy</td>
<td>Mammogram every 2-3 y age 50-69, weaker recommendation age 70-74</td>
<td>Mammogram every 2 y age 50-74</td>
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<tr>
<td><strong>Colorectal</strong></td>
<td>Age 45+ either FOBT yearly OR flex sig every 5 y OR colonoscopy every 10 y until age 75</td>
<td>Age 50-74 FIT/gFOBT every 2 y OR flex sig every 10 y; do not recommend for age 75+</td>
<td>Age 50-75 FOBT yearly +/- flex sig every 5 y OR colonoscopy every 10 y</td>
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ACS = American Cancer Society; CTFPHC = Canadian Task Force on Preventive Health Care; USPSTF = US Preventive Services Task Force
Motion

• Should breast and colorectal cancer screening be carried out in older adults?

• I will focus on older adults beyond age 70-75, where most guidelines are silent or dissuade against active screening

• And I will focus on those in average health (i.e. not very frail)
We should stop screening older adults for breast and colorectal cancer
We should stop screening older adults for breast and colorectal cancer

1. No level 1 evidence supporting cancer screening in this population.
2. Retrospective cohort data promoting screening are fundamentally flawed and unable to control for major confounding.
3. Risks and burdens of cancer screening increase with age. (And benefits go down.)
4. Modelling studies of cancer screening have important unverifiable assumptions.
5. Complex decision-making recommendations for screening incorporating life expectancy estimation, while attractive, are not feasible in practice and are only going to exacerbate current inappropriate screening practices in older adults.
THANK YOU!
1. No level 1 evidence supporting cancer screening in this population.

• No randomized trials (RCTs) have been conducted of screening in this older age group

• RCTs are the highest level of evidence supporting practice

• Least prone to bias, clarify important questions including demonstrating procedures that are ineffective (e.g. radical prostatectomy for men with T2 prostate cancer) or harmful (e.g. arrhythmia suppression post myocardial infarction)
2. _Retrospective cohort data promoting screening are fundamentally flawed and unable to control for major confounding._

- Numerous retrospective cohort studies have suggested benefits to continuing mammography in older women
- Many studies do not account for prior screening history
- People who continue to be screened are fundamentally different from those who do not
  - Healthier, health conscious, adherent, etc.
  - Almost guaranteed to look good no matter what intervention is being studied
Agreement of treatment effects for mortality from routinely collected data and subsequent randomized trials: meta-epidemiological survey

Lars G Hemkens,1,2 Despina G Contopoulous-Ioannidis,3,4 John P A Ioannidis1,4-6

• BMJ 2016; 352:1493
• Compared observational studies (n=16) to subsequent RCTs (n=36) with 17,275 patients
• 31% of time direction of treatment effects differed
• 56% of time confidence intervals from observational studies did not include RCT estimate
• 31% of time more favourable estimates in observational studies compared to RCTs
3. Risks and burdens of cancer screening increase with age. (And benefits go down.)

- Hubbard et al. (*Ann Intern Med* 2011; 155:481) examined the cumulative probability of false positives or biopsies after 10 years of mammography using data from 7 mammography registries.

- Probability of at least 1 false-positive recall over 10 years was 61.3% with annual screening and 41.6% with biennial screening.

- Cumulative probability of false-positive biopsies was 7.0% with annual screening and 4.8% with biennial screening.
ARTICLE

Benefits and Harms of Mammography Screening After Age 74 Years: Model Estimates of Overdiagnosis

Nicolien T. van Ravesteyn, Natasha K. Stout, Clyde B. Schechter, Eveline A. M. Heijnsdijk, Oguzhan Alagoz, Amy Trentham-Dietz, Jeanne S. Mandelblatt, Harry J. de Koning

Affiliations of authors: Department of Public Health, Erasmus MC, Rotterdam, the Netherlands (NTvR, EAMH, HJdK); Department of Population Medicine, Harvard Medical School/Harvard Pilgrim Health Care Institute, Boston, MA (NKS); Departments of Family and Social Medicine and Epidemiology and Population Health, Albert Einstein College of Medicine, Bronx, NY (CBS); Department of Industrial and Systems Engineering (OA) and Carbone Cancer Center and Department of Population Health Sciences (ATD), University of Wisconsin-Madison, Madison, WI; Department of Oncology, Georgetown University Medical Center and Cancer Prevention and Control Program, Lombardi Comprehensive Cancer Center, Washington, DC (JSM).

Correspondence to: Nicolien van Ravesteyn, PhD, Department of Public Health, Erasmus MC, PO Box 2040, 3000 CA Rotterdam, the Netherlands (e-mail: n.vanravesteyn@erasmusmc.nl).
3. Risks and burdens of cancer screening increase with age. (And benefits go down.)

- Van Ravesteyn et al. (*J Natl Cancer Inst* 2015; 107:djv103) used 3 microsimulation models to examine benefits and harms of mammography after age 74.
3. Risks and burdens of cancer screening increase with age. (And benefits go down.)

- Rabeneck et al. (Gastroenterology 2008; 135:1899) used administrative data from 4 Canadian provinces to examine rates of complications after screening colonoscopy.
- In 60-75 year olds the risk of perforation increased 106% compared to <60 (OR 2.06, 95% CI 1.79-2.37).
- Undoubtedly the rate will be even higher in older adults.
4. Modelling studies of cancer screening have important unverifiable assumptions.

• Numerous assumptions for efficacy, and utilities that are next to impossible to empirically verify

• For example:
  • 100% screening adherence
  • 100% adherence to recommended treatment
  • No toxicity of surgery or chemotherapy
  • No consideration of QOL/anxiety
  • Caucasian race-specific
  • Variable calibration against incidence or mortality
5. Complex decision-making recommendations for screening incorporating life expectancy estimation, while attractive, are not feasible in practice and are only going to exacerbate current inappropriate screening practices in older adults.

• Ample evidence of overscreening at present for breast and prostate cancer in patients with limited life expectancy (LE)

• This is despite widespread availability of free LE calculators

• Wide LE estimates at a group level, not at the level of the patient in front of you

• No screening trials have incorporated LE estimates
Barriers to LE-based screening

• Patients have highly favourable views of screening
  • Screening equated with health and life
• Limited time to discuss with primary care doctor (and cognitive burden)
• Some would seek second opinion or question physician’s recommendation to stop
• Distrust of experts, gov’t panels, and payers
• Many do not believe LE estimation reliable

Torke A.  *JAMA Intern Med* 2013; 173:526
Schoenborn NL.  *JAMA Intern Med* 2017; 177:1121
What about financial toxicity?
Conclusions

1. No level 1 evidence
2. Retrospective cohort data are flawed
3. Risks increase with age and benefits go down
4. Modelling studies have important unverifiable assumptions
5. Complex decision-making recommendations for screening incorporating LE estimation are not feasible or practical

• Thus, until level 1 evidence emerges, breast and colorectal cancer screening should cease in older adults at age 75.
thank you!