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Cancer screening among olders in Israel by life expectancy. cross sectional study

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Abstract

Background—Some organizations recommend that adults with <10 year life-expectancy (LE) not be screened for colon and breast cancer, due to a 10-years lag-time to benefit. We aimed to examine over-screening among older Israelis who were members of Clalit Health Services (CHS).

Design—A cross sectional study.

Setting—CHS is Israel's largest Health Maintenance Organization (HMO), providing care for over 50% of the country's population. National age-based programs for cancer screening are operated by CHS. Participants All community-dwelling members aged 65–79 in 2014 (n=370,876).

Measurements—We used CHS data warehouse to evaluate cancer screening during 2014. LE was estimated using the validated Schonberg index.

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- Conception or design of the work – Ronen Bareket, Shlomo Vinker, Doron Comaneshter
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Results—23.1% of the study population had an estimated LE of <10 years: 15.6% of adults aged 65–74 years, and 42.7% of adults aged 75–79 years. Annual fecal occult blood test and biannual mammography rates among adults aged 65–74 with 10+ LE were 37.1% and 70% respectively. Rates dropped after age 75 (3.96%, 19.5%) and to a lesser extent with LE<10 (31.6%, 56.4%). Prostate Specific Antigen testing is not part of the national screening program, and the proportion of people tested (42.6%), did not vary similarly with age >75 (43.2%) or LE<10 (38.1%).

Conclusion—Our findings suggest that the cancer screening inclusion criteria of the national referral system have a strong effect on actual receipt of screening, while LE considerations less influential. Some method of estimating life expectancy could be incorporated in algorithms to improve individualized cancer screening to reduce overscreening and underscreening in older adults.

Keywords

Life Expectancy; Early Detection of Cancer; Medical Overuse; Community Health Planning

Introduction

Worldwide, in developed countries, the population of adults aged 65 and older is rising rapidly and cancer incidence increases with age. Therefore, most developed countries include adults aged 65–74 in national screening programs for breast (women only) and colorectal cancer (CRC). However, it is estimated that 1,000 older adults need to be screened to avoid one breast or colon cancer death in 10 years.[1] Due to this 10-year lag-time to benefit, some organizations recommend that adults with <10 year life expectancy (LE) not be screened for these cancers.[2,3,4] The rationale is that these people will not live long enough to experience the life-prolonging benefits of cancer screening. Instead, screening these people only puts them at risk of the harms of cancer screening which include anxiety resulting from false positive tests, overdiagnosis (detection of tumors that are of no threat), and complications from work-up and/or treatment of cancer.[5] Despite this, 40–50% of US women ≥65 years with <10 year LE undergo screening for breast cancer with mammography and similarly 40–50% of US adults with <10 year LE undergo CRC screening.[6,7,8,9] In addition, while screening for prostate cancer with a prostate specific antigen (PSA) is controversial for any man regardless of their age, many continue to be screened including those with short life expectancy.[8,10]

Based on recommendations from the Israeli Task Force on Health Promotion, the Israeli Ministry of Health invites women up to age 74 to undergo mammography screening and adults up to age 74 to have a fecal occult blood test (FOBT), regardless of their health status or life expectancy.[11] A quality indicator program is in place to monitor and encourage compliance of age eligible members for the colorectal and breast cancer early detection programs. Clalit Health Services (CHS) is the largest health maintenance organization in Israel. It's active outreach programs promote participation, but are stopped once the person has reached the age of 75 years. Electronic medical record reminders for screening are visible for doctors during every medical interaction. PSA tests are ordered by primary care physicians and specialists for medical follow up of prostate cancer, as well as for screening purposes. Routine prostate cancer screening is neither recommended nor encouraged by the

ministry of health or by CHS. Comparing PSA utilization (no active outreach and not measured) to FOBT and Mammography (active outreach and measured) by age and life expectancy might help to illuminate the outreach and quality measures role in over and under screening older Israelis. We are unaware of studies that have examined overuse of cancer screening among older adults outside the US. Therefore, we aimed to examine overuse of cancer screening among older Israelis who were members of CHS.

Methods

Data Sources

Data was accessed from the CHS data warehouse. CHS insures and provides healthcare to 52% of Israel's population (more than 4,300,000 beneficiaries). The CHS medical information system is comprehensive, comprising socio-demographic data; information on the utilization of health care services, drug purchases, laboratory and imaging tests; and a wide-scale registry of chronic diagnoses.[12] The epidemiology unit of the CHS maintains a central comprehensive chronic diseases registry. This registry is continuously updated, based on an algorithm integrating all available data (hospitalization discharge diagnoses, chronic diagnoses in the primary care physician electronic medical record, laboratory test results, drug purchases, and other sources as relevant for each diagnosis).[13]

Study Population

We included all community-dwelling CHS members who were age 65–79 in 2014 (n=370,876). We excluded nursing home residents and people who left CHS or died during 2014 (n=3,398). We also excluded adults who had missing data needed to measure life expectancy (n=4,075). From the remaining 363,403 (199,387 females, 164,016 males) we excluded people with a history of CRC when examining use of CRC screening (n= 8,126) and we excluded people with a history of breast cancer and those that underwent breast MRI when examining mammography screening (n=14,832). We excluded people with history of prostate cancer when examining prostate cancer screening (n=7,920). Our final sample population included 363,403 individuals overall; 184,555 for evaluating breast cancer screening; 355,277 for evaluating CRC screening; and 156,096 for evaluating prostate cancer screening (Figure 1).

Estimating life expectancy

To estimate the life expectancy of each CHS member, we used the validated Schonberg mortality index initially developed using self-reported data from the US National Health Interview Survey.[14,15] The index considers a person's age, sex, body mass index (BMI), history of lung disease, cancer, diabetes, functional status (e.g., ability to do household chores), smoking status, hospitalizations, perceived health, and difficulty walking 3 blocks. Adults with >50% risk of mortality within 10 years based on their health score (based on scores of 10 or more) are considered to have an estimated life expectancy <10 years.[16]

We used data from the CHS data warehouse to extract the information needed for the Schonberg index to estimate a person's life expectancy. Eight of the 11 elements in the index were assessed by data extracted from the CHS warehouse: age, sex, BMI, hospitalizations,

smoking status, history of COPD, diabetes and cancer. The original Schonberg index asks people to self-report whether or not they have difficulty walking several blocks. We used whether or not a person had a positive Get up and Go test, had a Norton score 16 or bellow, or needed support at home.[17, 18] The original Schonberg index asks people if they need help from other persons in handling routine chores. We used whether a person required elderly nursing, or reported a limitation in an instrumental activities of daily living or a basic activity of daily living. Finally, the Schonberg index asks people whether, in general, their health is excellent/Very good/Good/Fair/Poor. We do not have these data in the CHS warehouse, but worried that omitting this element could lead us to overestimate life expectancy We therefore replaced self-rated overall health with the Chalrson score, which has been shown to correlate with perceived health.[19] We mapped Chalrson scores as follows: individuals with no comorbidities were treated as having excellent or very good self-reported health, Charlson scores of 1 were treated as having good health, and Chalrson scores ≥2 were treated as having fair or poor perceived health. As a sensitivity analysis, we repeated the calculations, using a partial model without this domain. Results were similar to those of the full analysis, and thus we chose to include the full version of the index in our final report. A threshold of a Modified Schonberg score of 10 was used to estimate people with <10 year LE.

Evaluation of Screening

CHS measures more then 60 Quality Indicators (QI) in the domains of preventive medicine, follow-up, and outcomes of chronic diseases, including CRC and breast cancer. These are regularly captured by automated algorithms from the CHS database, and were previously used to assess screening practices either by lab test results (FOBT) or by billing codes claims (Mammography, Colonoscopy etc.). FOBT for CRC screening, and mammography for breast cancer screening are routinely offered through an ongoing active outreach program to all CHS members, in accordance with national health recommendations. All FOBT samples are analyzed in one central laboratory, and recorded in the person's electronic health record. People were considered to have undergone FOBT screening for CRC if a test result was recorded in 2014 in a person without a diagnosis of CRC. Women who had undergone a mammogram in the years 2013–2014, without a previous diagnosis of breast cancer were considered to have been screened. For prostate cancer, we examined whether a man had a PSA test in 2014.

Statistical Analyses

The Modified Schonberg score was divided into two categories according to a threshold of 10 to identify people with <10 year LE. Chi-square tests were used to compare proportions of sample characteristics (gender, age groups, obesity, smoking, etc.) between patients with LE of more than 10 years and those with LE of less than 10 years. These tests were also done to examine receipt of screening for three types of cancer according to age groups and life expectancy. SPSS for Windows software, version 20.0 (SPSS, Inc.; Chicago, IL) was used for analyses.

Results

Of the 363,403 adults in our study population, 23.1% had an estimated life expectancy of under 10 years. Among the 262,152 adults aged 65–74 years in our sample, 15.6% had an estimated life expectancy of <10 years. Among the 101,251 adults aged 75–79 years, 42.7% had an estimated life expectancy <10 years, meaning that 57.3% had an estimated life expectancy of 10 or more years. Table 1 demonstrates the distribution of the different health conditions that make-up the Schonberg index by life expectancy (<10 year/10+ year). The proportions of people screened for different cancer types within age and life expectancy groups are shown in Table 2. FOBT screening was undertaken by 27.31% of the population, with 30.23% of 10+ year LE screened, versus 17.27% of <10-year LE. Among age-eligible adults aged 64–74 years, differences in screening rates were smaller (37.11% and 31.57% among 10+ year LE and <10-year LE, respectively. $p<0.001$). Screening rates were lower (3.96% and 3.60%) in 10+ year LE and <10-year LE ($p=0.002$) aged 75–79 years who were no longer actively invited for screening. A similar trend in the variation of mammography screening rates by age and life expectancy was also observed. Overally, 41% of men 65–79 years received PSA screening and there were no meaningful differences by age ($p<0.001$). Smaller proportuions of people with a shorter life expectancy were screened than those with a 10+ year LE (38.3% vs. 42.7%, respectively. $p<0.001$) Figure 2 illustrates the age and life expectancy distributions for each screening test. Smaller proportions of people with shorter life expectancy were screened in all age groups, but differences were small. FOBT and mammography rates among people over 75 were generally much lower in comparison to younger people, a trend which is not observed in PSA tests.

Discussion

We performed a cross-sectional study of all community-dwelling members aged 65-79 years of the largest health maintenance organization in Israel, comparing cancer screening in different age and calculated life expectancy groups. Among those age-eligible for cancer screening, 15.6% had a limited life expectancy (<10 years). Guidelines recommend avoidance of colon, breast, or prostate cancer screening in adults with <10 year life expectancy, but the proportions of the individuals screened did not vary meaningfully across the different life expectancy groups. Beyond age 75, screening participation for both life expectancy groups was much lower, and was very similar across people with LE<10-year LE and 10+ year LE. Among these older individuals, 57.3% had an estimated life expectancy of over 10 years, but only a small fraction of them were screened. Notably, there was little difference in the high proportions of men tested for PSA, regardless of age or life expectancy status. Our results, therefore, suggests significant over-screening of older adults with short life expectancies alongside under-screening of people over the age of 75 who have a favorable life expectancy.

Our data highlight how a national referral and quality measure system influences receipt of cancer screening tests among older adults. Once an individual crosses the 75-years-old threshold, and is not actively invited to be screened, a drastic decline in rates is demonstrated, from 36.3% to 3.8% for FOBT and from 69.5% to 18.2% for mammography. On the other hand, PSA testing is similar before age 75 (41.4%) in Israel and afterwards

(40.1%). PSA screening, unlike mammography and FOBT, is not part of the national referral and quality measure system, therefore its utilization is influenced by other factors. The fact that PSA rates are similar before and after age 75, and similar for those with <10-year LE and 10+ year LE, suggests that these other factors likely are not driving the substantially lower rates of screening using FOBT and mammography that we observed among people older than age 75. Therefore, the lower rates of CRC and breast cancer screening is likely explained mainly by the fact that at the age of 75 the national screening program ends.

Our findings are in line with those in previous studies that assessed cancer screening among people with different life expectancies in the United States. To the best of our knowledge similar assessments of populations outside the United States were not reported to date. Schonberg et al found that 55.7% of non-institutionalized US adults with <10-year LE had undergone CRC screening compared to 60.8% with 10+ year LE.[6] Pollack et al. compared 4 different prognostic tools, including the Schonberg Index in a Medicare sample of patients 65–90 years old. They reported that regardless of which prognostic method use, approximately 40% of women 66–90 with <10-year LE were screened for breast cancer, and approximately 70% of men 66-90 years received PSA testing[20].

Combined, this data suggests that non-individualized quality measures have a potential to encourage utilization of inappropriate care.

Israel's screening program is an organized population based program, like in most other western countries, and some organizations in the US (Kaiser Permanente Northern California programme and the Veterans Health Administration programme). As such it involves a process of inviting the target population to participate in screening and ensuring follow-up of those with a positive screen. The CHS program has no financial incentive to medical staff. In contrast, opportunistic screening is delivered usually through fee-for-service reimbursement of physicians, such as in most parts of the US. Since organized screening focuses on quality assurance, it attempts to provide greater protection against the possible harms of screening including overscreening and underscreening, poor quality, inappropriate use of resources, complications arising from screening and poor follow-up of those with a positive screen.[21] A more personalized approach within this organized system, such as including predicted life expectancy to the inclusion criteria, may help minimaize those harms.

The use of Schonberg index to predict life expectancy has not yet been validated using Electronic Health Data, nor has it been applied to populations outside the United States or in a prospective clinical setting. We used several proxies for subjective items, which may cause a bias. But agreement of our findings with those in different US populations strengthen our confidence. Furthermore, our sensitivity analyses supported our conclusions and minimize the possibility that these proxy substitutions markedly influenced our overall study findings. The factors used to assess life expectancy in this index have been found to be predictive of mortality in multiple studies, suggesting that those in our population with functional and mobility limitations and comorbidities likely have lower life expectancy than those without these conditions.[22, 23]

We did not have data on whether the tests were done for screening or diagnostic purposes. However, FOBT is recommended to use only for screening and is unlikely to be used for diagnostic purposes; and a study that was able to distinguish between diagnostic and screening mammograms found that only about 15% of all mammograms were diagnostic.[9]

Implications for practice

Our findings suggest that national cancer screening policies could incorporate predicted life expectancy in addition to age to reduce overscreening older adults with limited life expectancy. In addition, considering life expectancy in cancer screening decisions may reduce under-screening of adults over 75 years old with long predicted life expectancy. Our modified version of the Schonberg Index capitalized on electronic data that were readily available from the CHS data warehouse. Indices that capitalize on electronic data are well suited for inclusion in individualized screening policies in countries with organized population based screening programs. People with limited predicted life expectancy should have their physician evaluate potential benefits and harms of screening, instead of the automatic invitation for screening. Doing so, might help older adults with short predicted life expectancy avoid cancer screening tests with a long lag-time to benefit, that may only cause them harm.

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References

1. Lee SJ, Boscardin WJ, Stijacic-Cenzer I, et al. Time lag to benefit after screening for breast and colorectal cancer: meta-analysis of survival data from the United States, Sweden, United Kingdom, and Denmark. BMJ. 2013 Jan 8.346:e8441. [PubMed: 23299842]
2. Qaseem A, Denberg TD, Hopkins J, Robert H, et al. Screening for Colorectal Cancer: A Guidance Statement From the American College of Physicians. Ann Intern Med. 2012 Mar 6; 156(5):378–86. [PubMed: 22393133]
3. Lee CH, Dershaw DD, Kopans D, et al. Breast cancer screening with imaging: recommendations from the Society of Breast Imaging and the ACR on the use of mammography, breast MRI, breast ultrasound, and other technologies for the detection of clinically occult breast cancer. J Am Coll Radiol JACR. 2010 Jan; 7(1):18–27. [PubMed: 20129267]
4. Oeffinger KC, Fontham EH, Etzioni R, et al. Breast Cancer Screening for Women at Average Risk: 2015 Guideline Update from the American Cancer Society. JAMA. Oct 20; 2015 314(15):1599–1614. DOI: 10.1001/jama.2015.12783 [PubMed: 26501536]
5. Walter LC, Schonberg MA. Screening Mammography in Older Women: A Review. JAMA. 2014 Apr 2; 311(13):1336–47. [PubMed: 24691609]
6. Schonberg MA, Breslau ES, Hamel MB, et al. Colon cancer screening in U.S. adults aged 65 and older according to life expectancy and age. J Am Geriatr Soc. 2015 Apr; 63(4):750–6. [PubMed: 25900488]
7. Schonberg MA, Breslau ES, McCarthy EP. Targeting of Mammography Screening by Life Expectancy Among Women Aged 75 and Older. J Am Geriatr Soc. 2013 Mar; 61(3):388–95. [PubMed: 23414437]

8. Royce TJ, Hendrix LH, Stokes WA, et al. Cancer screening rates in individuals with different life expectancies. JAMA Intern Med. 2014; 174(10):1558–65. [PubMed: 25133746]
9. Walter LC, Lindquist K, Covinsky KE. Relationship between Health Status and Use of Screening Mammography and Papanicolaou Smears among Women Older Than 70 Years of Age. Ann Intern Med. 2004 May 4; 140(9):681–8. [PubMed: 15126251]
10. Abdollah, F., Sun, M., Sammon, JD., et al. Prevalence of nonrecommended screening for prostate cancer and breast cancer in the united states: A nationwide survey analysis. JAMA Oncol [Internet]. 2016 Jan 21. [cited 2016 Feb 1]; Available from: http://dx.doi.org/10.1001/jamaoncol.2015.5871
11. Tabenkin C, Lahad A. Israeli Task Force for Health promotion and preventive medicine - Prevention and early detection of malignant diseases. Israeli Medical Association. 2013
12. Rennert G, Peterburg Y. Prevalence of selected chronic diseases in Israel. Isr Med Assoc J IMAJ. 2001 Jun; 3(6):404–8. [PubMed: 11433630]
13. Vinker, S., Bitterman, H., Comaneshter, D., et al. Physicians' behavior following changes in LDL cholesterol target goals. Isr J Health Policy Res [Internet]. 2015 Jun 1. [cited 2016 Jan 11];4. Available from: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4450467/
14. Schonberg MA, Davis RB, McCarthy EP, et al. Index to Predict 5-Year Mortality of Community-Dwelling Adults Aged 65 and Older Using Data from the National Health Interview Survey. J Gen Intern Med. 2009 Oct; 24(10):1115–22. [PubMed: 19649678]
15. Schonberg MA, Li V, Marcantonio ER, Davis RB, McCarthy EP. Predicting mortality up to 14 years among community-dwelling adults aged 65 and older. J Am Geriatr Soc. 2016 Epub ahead of print.
16. Centers for Disease Control. Vital and Health Statistics from the Centers from Disease Control and Prevention. Method for construction of completed annual US life tables [Internet]. 1999. [cited 2012 Jul 19]. Available from: http://www.cdc.gov/nchs/data/series/sr_02/sr02_129.pdf
17. Podsiadlo, Diane, Richardson, Sandra. The Timed 'Up & Go': A Test of Basic Functional Mobility for Frail Elderly Persons. Journal of the American Geriatrics Society. Feb 1; 1991 39(2):142–48. DOI: 10.1111/j.1532-5415.1991.tb01616.x [PubMed: 1991946]
18. Norton D. Calculating the Risk: Reflections on the Norton Scale. 1989. Advances in Wound Care: The Journal for Prevention and Healing. Dec; 1996 9(6):38–43.
19. Bayliss EA, Ellis JL, Shoup JA, et al. Association of Patient-Centered Outcomes With Patient-Reported and ICD-9–Based Morbidity Measures. Ann Fam Med. 2012 Mar 1; 10(2):126–33. [PubMed: 22412004]
20. Pollack, Craig Evan, Blackford, Amanda L., Schoenborn, Nancy L., Boyd, Cynthia M., Peairs, Kimberly S., DuGoff, Eva H. Comparing Prognostic Tools for Cancer Screening: Considerations for Clinical Practice and Performance Assessment. Journal of the American Geriatrics Society. May 1; 2016 64(5):1032–38. DOI: 10.1111/jgs.14089 [PubMed: 27131231]
21. Schreuders E, Ruco A, Rabeneck L, et al. Colorectal cancer screening: a global overview of existing programmes. Gut. 2015; 64(10):1637–1649. [PubMed: 26041752]
22. Yourman LC, Lee SJ, Schonberg MA, et al. Prognostic indices for older adults: A systematic review. JAMA. 2012 Jan 11; 307(2):182–92. [PubMed: 22235089]
23. Goldman N, Glei DA, Weinstein M. What Matters Most for Predicting Survival? A Multinational Population-Based Cohort Study. PLOS ONE. 2016 Jul 19.11(7):e0159273. [PubMed: 27434271]

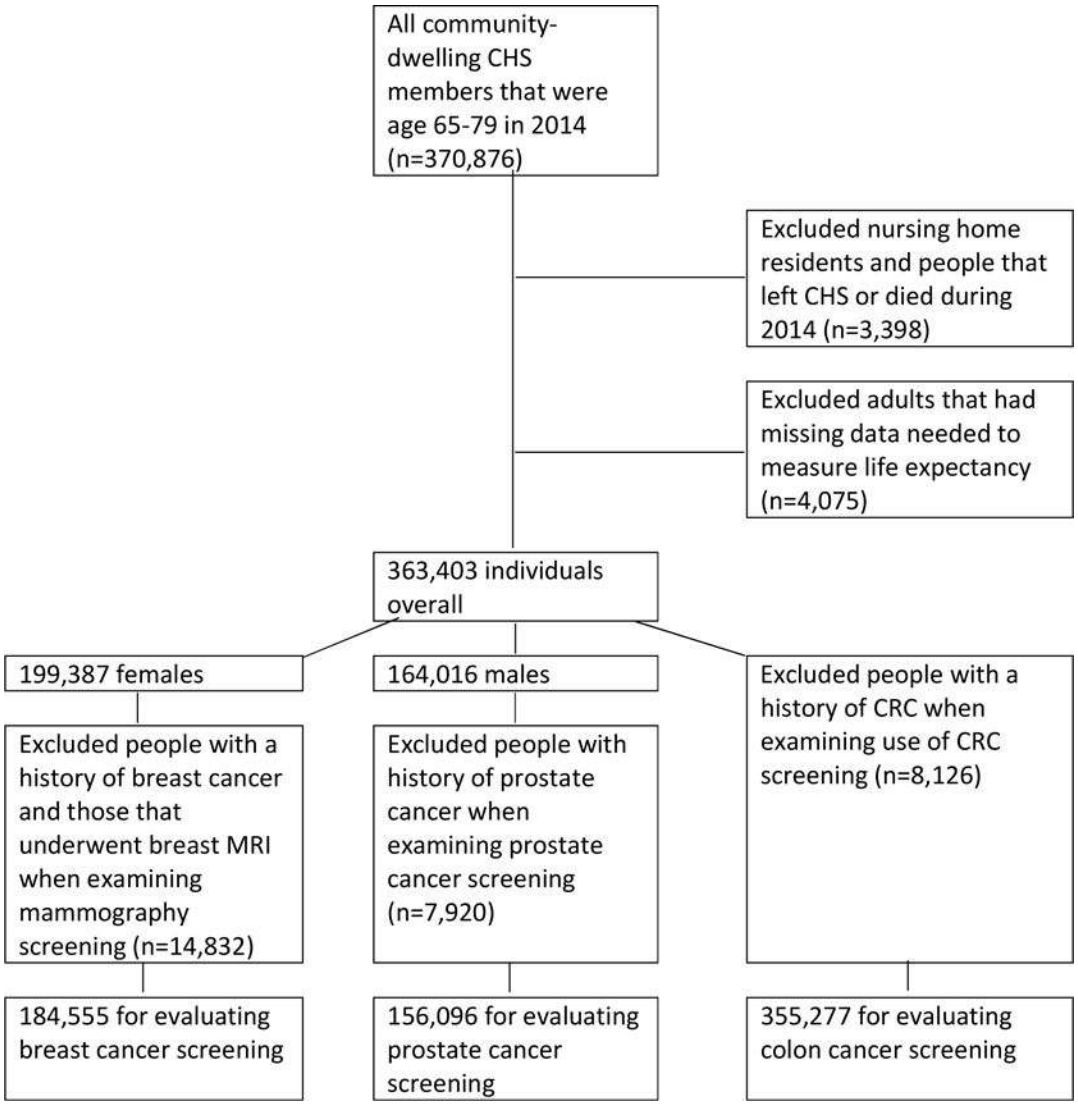

Figure 1. Study Population
CHS=Clalit Health Services, CRC=Colorectal Cancer

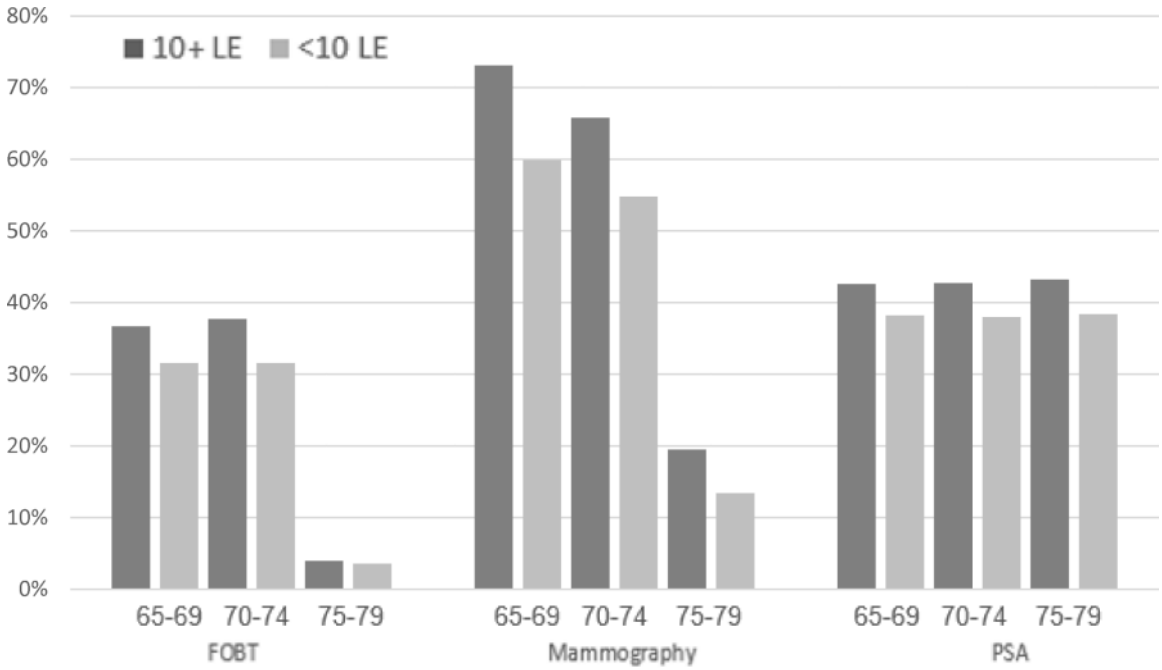

Figure 2. Screening rates by age groups and Schonberg score

Smaller proportions of people with shorter life expectancy were screened in all age groups, but differences were small. FOBT and mammography rates among people over 75 were generally much lower in comparison to younger people, a trend which is not observed in PSA tests. The lower rates of CRC and breast cancer screening is likely explained mainly by the fact that at the age of 75 the national screening program ends.

LE=Life Expectancy, FOBT=Fecal Occult Blood Test, PSA=Prostatic Specific Antigen.

Table 1

Study sample by Schonberg score components and life expectancy

Demographics/clinical details		Less than 10 years of life expectancy	10 or more years of life expectancy	P value
Total number of people		84,285	279,118	
Age, years				<0.001
	65–69	21.3%	47.9%	
	70–74	27.4%	31.3%	
	75–79	51.3%	20.8%	
Male sex		76.2%	35.8%	<0.001
Smoking status				<0.001
	Never	34.0%	73.4%	
	Former	15.4%	11.2%	
	Current	50.6%	15.4%	
Body Mass Index <25		35.6%	23.8%	<0.001
Comorbid conditions	Cancer	33.4%	11.1%	<0.001
	Diabetes mellitus	60.4%	25.6%	<0.001
	COPD	21.3%	2.7%	<0.001
Overnight hospitalizations in past year				<0.001
	None	69.0%	91.8%	
	One	17.3%	7.0%	
	Two or more	13.8%	1.1%	
Charlson score *				<0.001
	1	1%	29.2%	
	2	9.2%	29.8%	
	>2	89.9%	41%	
Functional measures	Dependent in at least one IADL	2.7%	0.1%	<0.001
	Difficulty walking several blocks	22.3%	2.9%	<0.001

* Charlson score was used as a proxy for the self-reported perceived health: Excellent/very good (Charlson score 1), Good (Charlson score 2), Fair/poor (Charlson score above 2)

COPD = Chronic Obstructive Pulmonary Disease. IADL = Instrumental Activities of daily living

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Table 2

Proportions of people screened for cancer by screening type and Life Expectancy (LE)

		All patients		LE>10 years (n=275,294)	LE<10 years (n=79,983)	
		N (%)	P*	N (%)	N (%)	P**
FOBT	All (n=355,277)	97,024 (27.3)		83,212 (30.2)	13,812 (17.3)	<0.001
	64–74 (n=257,215)	93,289 (36.3)	<0.001	80,948 (37.1)	12,341 (31.6)	<0.001
	75–79 (n=98,062)	3,735 (3.8)		2,264 (4.0)	1,471 (3.6)	0.002
Mammography	all (n=184,555)	100,897 (54.7)		96,270 (57.5)	4,627 (27.1)	<0.001
	65–74 (n=131,341)	91,234 (69.5)	<0.001	88,165 (70.0)	3,069 (56.4)	<0.001
	75–79 (n=9,663)	9,663 (18.2)		8,105 (19.5)	1,558 (13.4)	<0.001
PSA	all (n=156,096)	64,065 (41.0)		41,802 (42.7)	22,263 (38.3)	<0.001
	65–74 (n=115,955)	47,980 (41.4)	<0.001	35,888 (42.6)	12,092 (38.1)	<0.001
	75–79 (n=40,141)	16,085 (40.1)		5,914 (43.2)	10,171 (38.4)	<0.001

FOBT = Fecal Occult Blood Test, PSA = prostate specific antigen, LE = Life Expectancy.

*Chi^2 for difference in screening proportions between the age groups between age groups.

**Chi^2 for difference in screening proportions within age group.