Letters

RESEARCH LETTER

LESS IS MORE

Overdiagnosis and Overtreatment: Evaluation of What Physicians Tell Their Patients About Screening Harms

Cancer screening can produce benefits: finding true and treatable cancer at an early stage. However, it also can produce harms by overdiagnosis and overtreatment.[1-3] Overdiagnosis is the detection of pseudodisease—screening-detected abnormalities that meet the pathologic definition of cancer but will never progress to cause symptoms. The consequence of overdiagnosis is overtreatment—surgery, chemotherapy, or radiation—that provides the patient no benefits, but only adverse effects. For instance, for every 2000 women attending mammography screening throughout 10 years, 1 less dies of breast cancer. Concurrently, approximately 10 women with pseudodisease receive a diagnosis of breast cancer and are unnecessarily treated.[4] Are patients informed about overdiagnosis by their physicians when discussing cancer screening? How much overdiagnosis would they tolerate when deciding to start or continue screening?

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Methods | We conducted a national cross-sectional online survey of 317 US men and women aged 50 to 69 years (**Table**), a population with the highest exposure to screening programs. The Ethics Committee of the Max Planck Institute for Human Development approved the study. Participants signed electronic consent forms to enroll in the online study. The sample was drawn from the US panel of Survey Sampling International in December 2010 according to a quota method based on official US statistics[5] concerning sex, ethnicity, and educational level (see eFigure in the Supplement). Two screener questions ensured that only persons who indicated no cancer history and who had been invited to undergo cancer screening by their physicians in the past could access the survey. To ensure that all participants had the same knowledge of overdiagnosis and overtreatment, we introduced these concepts at the beginning of the survey (see eMethods section in the Supplement). Because the survey did not allow item nonresponse, all questionnaires were complete.

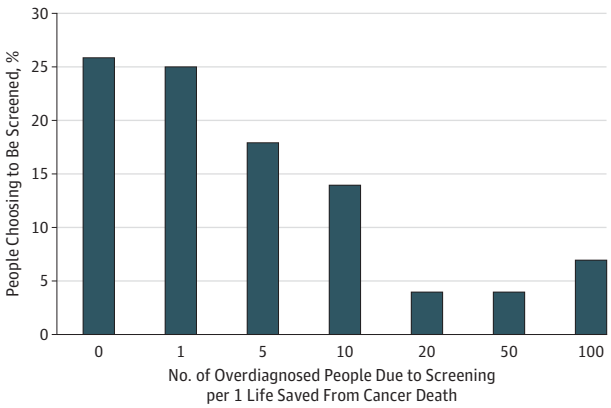
Results | Of the sample 19.9% reported having attended 1 routine cancer screening, 36.0% reported 2 screenings, 27.1% reported 3 or more, and 17.0% indicated none. Mammography was the most common cancer screening reported by women, and colonoscopy/sigmoidoscopy and prostate-specific antigen (PSA) testing were the most common reported by men. Of the entire sample, only 9.5% of the individuals (n = 30) said that their physician had informed them about the possibility of overdiagnosis and overtreatment when discussing cancer screening (Table). Nine of these patients indicated that their physician quantified the risk of overdiagnosis. However, with one exception, the numbers participants provided (ranges:

Table. Demographics of Survey Respondents, Their Information Status, and Tolerance of Overtreatment

Characteristic	No. (%) of Survey Respondents	%		
		2008 US Census[a]	Informed of Overtreatment by Their Physicians	Would Not Start Cancer Screening If It Resulted in >1 Overtreated Person per 1 Life Saved
Overall	317 (100.0)	100	9.5	51.2
Sex				
Female	166 (52.4)	52	8.4	51.2
Male	151 (47.6)	48	10.6	52.3
Age, y				
50-59	192 (60.6)	61	9.4	47.9
60-69	125 (39.4)	39	9.6	55.2
Educational level				
Less than high school	22 (6.9)	13	9.1	45.4
High school/some college	203 (64.0)	58	10.3	82.8
College degree	92 (29.0)	29	7.6	50.0
Ethnicity				
White	269 (84.9)	85	8.9	52.0
African American /Asian/other minority	48 (15.1)	15	12.5	39.6

[a] Data obtained from the US Census Bureau, Current Population Survey, 2008 Annual Social and Economic Supplement.[1]

Figure. Proportion of Participants Answering the Question on Overdiagnosis



For the survey item on the number of overdiagnosed people per 1 life saved from cancer death due to screening that they would find tolerable while still being prepared to start screening, participants were able to choose from the following options: 0, up to 1, up to 5, up to 10, up to 20, up to 50, and up to 100.

mammography, 10-30; PSA testing, 0-2; and sigmoidoscopy, 3-40) were either overestimates or underestimates of the risk reported in the current literature.[4,6,7] Eighty percent of all participants expressed the desire to be told about screening harms before undergoing the testing. Of 27 people who had received no cancer screening but had heard about the accompanying risk of overtreatment, 9 (34%) persons indicated that the possibility of overtreatment had been an argument against screening up to that point.

The tradeoff between the benefit of screening—life saved from cancer—and its harms—overdiagnosis and overtreatment—were systematically different for decisions on whether to start or continue cancer screening. Fifty-one percent of all participants were unprepared to start a screening that results in more than 1 overtreated person per 1 life saved from death due to cancer (**Figure**). However, 58.9% would continue cancer screening that they are receiving regularly even if they learned that the test results in 10 overtreated persons per 1 life saved from cancer death.

Discussion | Most participants in our sample who underwent routine cancer screening reported that their physicians did not tell them about overdiagnosis and overtreatment. The few who received information about overtreatment had unrealistic beliefs about the extent of that risk. The large number of uninformed patients might be explained by a large number of physicians who themselves know little about screening harms. When a national sample of 412 US primary care physicians, part of a larger project on physicians' understanding of cancer screening statistics,[8] was asked about the extent of overdiagnosis for mammography screening and PSA testing; only 33.9% and 42.9%, respectively, were able to provide a correct estimate.

The results of the present study indicate that physicians' counseling on screening does not meet patients' standards. Most individuals desired information about screening harms, which was not given, and attested that this knowledge would matter to them: 69% of the sample indicated that they would not start screening if overdiagnosis was as high (ie, ≥10 cases per 1 life saved) as it is in mammography and PSA testing.[4,6]

Our results should prompt medical educators to improve the quality of teaching about screening and encourage medical journal editors to enforce clear reporting about overtreatment when publishing results on the effectiveness of cancer screening. These means may not be sufficient but would be a first step toward enhancing the number of physicians and patients who thoroughly understand the potential consequences of taking a cancer screening test.

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Correction: This article was corrected on November 15, 2013, to fix the Figure.

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