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Enthusiasm for Cancer Screening in the United States

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HERE IS A GROWING RECOGNITION among medical professionals that cancer screening is a double-edged sword. While some individuals may benefit from early detection, others may only be diagnosed and treated for cancer unnecessarily.^{1,2} In recent years, the public has been exposed to expert debate about many of the most basic assumptions of screening: some scientists have challenged the utility of mammography for women younger than age 50 years³⁻⁵ or even for women at any age^{6,7}; questions have been raised about how often to be screened for cervical cancer^{8,9}; and whether to be screened at all for prostate^{8,9} or lung cancer.¹⁰ Emerging from these debates is a growing consensus that to make good decisions about screening, the public needs access to balanced information about its potential benefits and harms.^{11,12}

But the public has long received a different message. Public health officials, physicians, and disease advocacy groups have worked hard over a number of years to persuade individuals living in the United States about the importance of cancer screening. It is practically impossible to read a major newspaper or popular magazine, watch television, ride public transportation, visit the beauty parlor,¹³ or even lick a stamp¹⁴ without seeing a public service announcement promoting some form of cancer screening. Most recently, aggressive direct to consumer advertising is bringing a va-

Context Public health officials, physicians, and disease advocacy groups have worked hard to educate individuals living in the United States about the importance of cancer screening.

Objective To determine the public's enthusiasm for early cancer detection.

Design, Setting, and Participants Survey using a national telephone interview of adults selected by random digit dialing, conducted from December 2001 through July 2002. Five hundred individuals participated (women aged ≥ 40 years and men aged ≥ 50 years; without a history of cancer).

Main Outcome Measures Responses to a survey with 5 modules: a general screening module (eg, value of early detection, total-body computed tomography); and 4 screening test modules: Papanicolaou test; mammography; prostate-specific antigen (PSA) test; and sigmoidoscopy or colonoscopy.

Results Most adults (87%) believe routine cancer screening is almost always a good idea and that finding cancer early saves lives (74% said most or all the time). Less than one third believe that there will be a time when they will stop undergoing routine screening. A substantial proportion believe that an 80-year-old who chose not to be tested was irresponsible: ranging from 41% with regard to mammography to 32% for colonoscopy. Thirty-eight percent of respondents had experienced at least 1 false-positive screening test; more than 40% of these individuals characterized that experience as "very scary" or the "scariest time of my life." Yet, looking back, 98% were glad they had had the initial screening test. Most had a strong desire to know about the presence of cancer regardless of its implications: two thirds said they would want to be tested for cancer even if nothing could be done; and 56% said they would want to be tested for what is sometimes termed *pseudodisease* (cancers growing so slowly that they would never cause problems during the persons lifetime even if untreated). Seventy-three percent of respondents would prefer to receive a total-body computed tomographic scan instead of receiving \$1000 in cash.

Conclusions The public is enthusiastic about cancer screening. This commitment is not dampened by false-positive test results or the possibility that testing could lead to unnecessary treatment. This enthusiasm creates an environment ripe for the premature diffusion of technologies such as total-body computed tomographic scanning, placing the public at risk of overtesting and overtreatment.

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riety of new advanced, but unproven screening tests including brain magnetic resonance imaging, lung and total-body computed tomographic (CT) screening,¹⁵ and genetic testing for "cancer genes" to the public.¹⁶

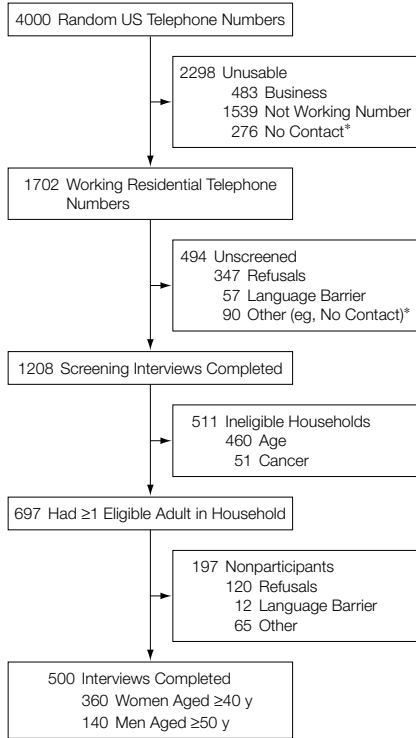
To understand the issues facing those who hope to bring balanced information to the public, we conducted a national telephone survey during 2001 and 2002 to learn about adults' experience with a broad array of screening

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Figure 1. Survey Sample



Asterisk indicates after 10 attempts at different times of the day and 3 additional attempts 2 weeks later.

tests. Specifically, we explored general beliefs about early detection, personal commitment to screening, screening as an obligation, attitudes toward false-positive results, and desire for total-body CT scanning, a new and potentially comprehensive screening method.

METHODS

Sample Selection

Our goal was to interview a nationally representative sample of adults for whom screening for cancer was relevant. Because our focus was on screening, we specifically targeted a screen-eligible population. Thus, we excluded individuals with a history of cancer because a prior cancer diagnosis may change how one thinks about screening and early detection. We further restricted our sample to women aged 40 years or older and to men aged 50 years or older because it is at these ages that most cancer screening is recom-

mended (a notable exception being Papanicolaou testing). This project was approved by the institutional review boards at Dartmouth Medical School, Hanover, NH, and at the University of Massachusetts, Boston.

We used random digit dialing to obtain a national probability sample of households in the continental United States with telephone service. FIGURE 1 details the steps of our sampling procedure. The process began with the generation of a random list of 4000 US telephone numbers for the goal of 500 completed interviews. From this list, 1702 working residential telephone numbers were identified. Interviewers successfully completed a 3-minute “screening” interview with an English-speaking adult at 1208 of the residences to identify individuals meeting study criteria. At least one eligible adult resided in 697 of the households (if ≥1 eligible adult was identified, a computer selected a respondent so that each eligible person had an equal chance of being selected). A total of 500 individuals completed the interview.

There is some debate in the survey research literature about how best to calculate a response rate in this setting. The specific question is whether to account for residences that could not be screened. To maximize transparency of this issue, the American Association of Public Opinion Research¹⁷ suggests calculating 2 response rates using 2 different denominators. The simplest approach (commonly seen in the literature) is to ignore unscreened residences and use known eligible households as the denominator. In our case, 500 responses were obtained from 697 eligible households—a response rate of 72% among individuals known to be eligible. However, there are almost certainly some eligible households among those not screened. The second approach attempts to account for this by increasing the denominator to include the estimated number of eligible households among unscreened households. This estimate takes the proportion eligible among those households screened (in our case, 697/1208=0.58)

as the best estimate of the proportion eligible among those households not screened. Thus in our case, among the 494 households not screened, 287 (0.58 × 494) would be expected to be eligible. Using this approach, we obtained 500 responses from an estimated 984 (697 + 287) eligible households—providing responses from 51% of those estimated to be eligible (N=500).

Interview Protocol

Development. To learn how the public thinks about screening, we conducted 2 focus groups with adults aged 40 years or older to discuss cancer screening tests in general, experiences with specific tests, and perceptions of the pros and cons of such testing. The focus group and all subsequent survey development was done in collaboration with experts at the Center for Survey Research, a professional survey research firm affiliated with the University of Massachusetts. A draft survey instrument was developed based on the results of the focus groups. Experienced interviewers then conducted 10 cognitive interviews to ensure that the questions were understood and that the answers were meaningful. After revising the draft based on this feedback, 17 eligible adults identified by random digit dialing completed the survey; these interviews were audiotaped and then coded to identify questions that were difficult for interviewers to read or for respondents to answer. Final revisions were made to the survey based on the pretest results.

Instrument. The survey consisted of a general screening module (general questions about the value of early detection, worry about cancer, and interest in total-body CT screening) and 4 modules about common screening tests (mammography, Papanicolaou smear, prostate-specific antigen [PSA] testing, and sigmoidoscopy or colonoscopy). The screening test modules contained a parallel series of questions about the value of the test, testing preferences (eg, frequency, starting and stopping age, current behavior), experience with ab-

normal test results, understanding of screening controversies or uncertainties and risk perceptions about the corresponding cancer. All respondents received the general screening module and the sigmoidoscopy or colonoscopy module; women also received the mammography and Papanicolaou test modules, while men received the PSA module.

Administration. From December 2001 through July 2002, interviews were conducted by professional interviewers from the University of Massachusetts Center for Survey Research. All interviewers received special training on the purposes and procedures of this particular study; all underwent routine monitoring for quality control and feedback from a supervisor. The interviews took an average of 20 minutes (range, 10-54 minutes). Answers to the questions were directly entered into the computer-assisted telephone interviewing system by the interviewer.

Analysis. We created weights to account for differential probability of selection into our sample. An individual's probability of selection was a function of the number of residential voice telephone lines (ie, more phone lines, higher probability of selection) and the number of eligible adults at the residence (ie, more eligible adults, lower probability of selection).

Survey researchers sometimes create a second set of weights to force the sample proportions for selected demographic characteristics to match those in the population. Theoretically such poststratification weights reduce bias resulting from differences in response rates among demographic subgroups. The technique is controversial, however, because it requires a substantial assumption that nonrespondents would answer questions similarly to respondents. Thus, if Native American males who did not graduate from high school were underrepresented in the sample, the responses of these few individuals would be weighted upward to represent the US population proportion of this subgroup. Ironically, the more this kind of weighting has the potential to influence the results (ie, when the

sample looks least like the target population), the more heroic the assumption.

Because the distribution of most demographic characteristics in our sample closely approximated those in the 2000 US Census (TABLE 1), poststratification weighting is unlikely to influence our results. Nevertheless, because the lowest education and oldest age groups were underrepresented, we created poststratification weights to match the US Census distribution on age, sex, race, Hispanic origin, educational attainment, and region.¹⁸ Analyses using these weights yielded results nearly identical (ie, $\pm 1\%$ -2%) to those using only the probability weights. For simplicity, and to avoid the assumptions inherent in poststratification weighting, we present results using only the probability weights. All analyses

were performed using STATA statistical software (Version 7; College Station, Tex).

RESULTS

Desire for Early Detection

Most adults (87%) living in the United States believe routine cancer screening is "almost always a good idea." Seventy-four percent believe that finding cancer early saves lives "most" or "all of the time" (TABLE 2). Fifty-three percent believe screening usually reduces the amount of treatment needed when cancer is found. But enthusiasm for screening also reflects a desire to know about the presence of cancer—regardless of its implications. Two thirds of individuals would want to be tested for a cancer even if nothing could be done. Fifty-six percent would want to be tested for what is sometimes called

Table 1. Demographic Characteristics for Women Older Than 40 Years and Men Older Than 50 Years

Characteristic	No.* of Survey Respondents (Weighted %†) (N = 500)	% in 2000 US Census ¹⁸
Age, y		
40-49	155 (26)	22
50-69	257 (57)	53
70-84	77 (17)	21
≥ 85	3 (1)	4
Sex		
Men	140 (33)	35
Women	360 (67)	65
Race		
White	397 (81)	85
Black	51 (10)	10
American Indian	9 (2)	1
Asian	17 (4)	3
Other	15 (3)	1
Hispanic		
No	470 (95)	95
Yes	24 (5)	5
Geographic region		
Northeast	92 (18)	20
Midwest	131 (29)	24
South	188 (38)	36
West	89 (15)	20
Education		
<High school	27 (6)	17
High school graduate	136 (31)	35
Some college	140 (27)	25
College degree	194 (37)	23

*Numbers may not add to 500 due to lack of response for an item.

†Percentages are weighted estimates to account for the sampling strategy and may not add to 100% due to rounding.

pseudodisease, cancers so slow growing that even untreated would never cause problems during the person's lifetime. Thirty-five percent believed they had had too few cancer screening tests in the past (64% thought they had had "about the right number"). Virtually no one interviewed (2%) thought they had had "too many" cancer screening tests.

Personal Commitment to Screening

We found that most adults say they have had cancer screening tests: 99% of US women aged 40 years or older reported having a Papanicolaou test and having 89% mammography; 71% of men aged 50 years or older had a PSA test; and 46% of the men and women

in these age groups had a sigmoidoscopy or colonoscopy (our findings closely reflect those from the 2001 Behavioral Risk Factor Surveillance Survey¹⁹ whose corresponding numbers were 96%, 88%, 75%, and 48%, respectively). We also found that most women who had been screened with a Papanicolaou test or mammography and most men who had been screened with a PSA plan to undergo at least annual testing (TABLE 3).

To further gauge how personally committed individuals are to screening, we asked those who were currently being screened how they would respond if their physician told them to be screened less often. Fifty-eight percent of women said they would over-

rule their physician if he or she suggested less frequent Papanicolaou tests. Seventy-seven percent of men would continue to undergo prostate screening and 74% of men and women would continue with colon cancer screening (colonoscopy or sigmoidoscopy) even if their physician recommended against testing. Few individuals thought there would ever be a time when they would stop having routine screening tests; ranging from a high of 35% saying they would ever stop having Papanicolaou tests to a low of 21% for stopping mammography. In addition, if cost was not a concern, some would like to be screened as frequently as every 6 months: 4% for colonoscopy or sigmoidoscopy, 13% for Papanicolaou test, 16% for mammography, and 19% for PSA test.

Table 2. General Beliefs About Early Detection

	No.* of Survey Respondents (Weighted %†) (N = 500)
How often does finding cancer early mean that treatment saves lives?	
None of the time	10 (3)
Some of the time	122 (24)
Most of the time	287 (58)
All of the time	79 (16)
How often does finding cancer early mean that a person can have less treatment?	
None of the time	16 (3)
Some of the time	220 (44)
Most of the time	195 (42)
All of the time	52 (11)
If there was a kind of cancer for which nothing can be done, would you want to be tested to see if you have it?	
No	64 (34)
Yes	325 (66)
Have you ever heard of cancers that grow so slowly that they are unlikely to cause you problems in your lifetime?	
No	248 (48)
Yes	251 (52)
Would you want to be tested to see if you had a slow-growing cancer like that?	
No	201 (44)
Yes	288 (56)
Routine screening means testing healthy persons to find cancer before they have any symptoms. Do you think routine cancer screening tests for healthy persons are almost always a good idea?	
No	57 (13)
Yes	439 (87)
In the past, do you think you have had too many routine screening tests for cancer, too few tests, or about the right number?	
Too few	171 (35)
About the right number	304 (64)
Too many	10 (2)

*Numbers may not add to 500 because of item nonresponse.

†Percentages are weighted estimates to account for the sampling strategy and may not add to 100% due to rounding.

Screening as an Obligation

To learn whether the public views screening as an obligation (eg, the right thing to do, or something individuals owe to their loved ones), we asked respondents to judge whether a person in average health would be "irresponsible" if he or she did not have screening (FIGURE 2). When asked about a 55-year-old person in average health, responses ranged from 79% (rating forgoing Papanicolaou tests as irresponsible) to 54% (for colonoscopy). A substantial proportion also believed that an 80-year-old who chose not to be tested was irresponsible: ranging from 41% for mammography to 32% for colonoscopy.

Impact of False-Positive Results

Overall, 38% of men and women in our sample had had at least 1 false-positive screening result that required further testing (11% for PSA, 30% for Papanicolaou, and 35% for mammography). Many of these individuals underwent invasive follow-up procedures (TABLE 4). While most individuals found out they did not have cancer within 2 weeks, 25% of women with abnormal Papanicolaou test results, 13% with abnormal mammograms, and 25% of men with false-

positive PSA test results waited more than 1 month for this information. Many individuals characterized this time as either “very scary” or the “scariest time” of their lives (43% for Papanicolaou test, 37% for mammography, and 58% for PSA test). Yet, looking back, 98% were glad they had had the initial screening test.

Total-Body CT Scanning

Finally, to gauge general enthusiasm for screening, we examined the public’s interest in total-body CT scanning, a relatively new technology now aggressively marketed to consumers. We first

described a total-body CT as a “3-D look inside your body using a CT scanner. A CT scan gives a very detailed picture of your lungs, liver, heart, and other internal organs, as well as bones and arteries. A total body scan can find many diseases like cancer before they can be found by routine check-ups. The body scan is quick and painless.” After hearing this description, 86% said they wanted to have a free total-body CT. To learn about the strength of desire for CT, we asked those individuals who chose a free CT whether they would prefer a total-body CT scan or receiving \$1000 in cash. Eighty-five per-

cent would choose the total-body CT scan (ie, 73% of the entire sample). Only 27% thought there might be any downside to having a total-body scan (mostly discomfort during the procedure or anxiety); 14% mentioned concern for false-positive results, and 3% mentioned the downside of unnecessary subsequent testing.

COMMENT

Most people in the United States are firmly committed to cancer screening. Most individuals would overrule a physician who recommended against cancer screening and could not imagine a

Table 3. Personal Commitment to Screening Among Persons Who Had Been Previously Screened*

	No. for Papanicolaou Test (Weight %) (n = 355)	No. for Mammography (Weighted %) (n = 317)	No. for Prostate-Specific Antigen Test (Weighted %) (n = 97)	No. for Colonoscopy or Sigmoidoscopy (Weighted %) (n = 219)
Screening Behavior				
At what age did you have your first [test]?				
<40 y	315 (88)	133 (42)	0	32 (13)
40-49 y	39 (12)	140 (43)	19 (17)	42 (20)
≥50 y	0	44 (15)	77 (73)	141 (67)
Do you have a plan for how often you get [test]?				
No	109 (31)	76 (23)	40 (41)	138 (63)
Yes	246 (69)	241 (77)	57 (59)	81 (37)
If yes, how often?				
More than once per year	9 (4)	7 (4)	7 (10)	NA†
Once per year	200 (82)	201 (85)	43 (79)	NA†
Every 2 y	34 (13)	25 (10)	5 (9)	NA†
Every 3 y or less often	3 (1)	4 (1)	1 (3)	NA†
Commitment to Screening				
If cost was not a concern, would you like to have [test]?				
Every month	2 (1)	1	0	0
Every 6 mo	46 (12)	51 (16)	19 (19)	5 (4)
Every year	220 (63)	189 (61)	57 (56)	29 (17)
Every 2 y	48 (14)	50 (16)	15 (18)	53 (31)
≤Every 5 y	33 (11)	23 (7)	6 (7)	85 (48)
Do you think there might be a time when you still stop having routine [test]?				
No	226 (65)	252 (79)	68 (73)	112 (68)
Yes	114 (35)	60 (21)	26 (27)	56 (33)
If a physician recommended you stop having or have less frequent testing. Would you?‡				
Try to keep having them	206 (58)	NA	72 (77)	70 (74)
Agree to have less	143 (43)	NA	20 (23)	34 (26)

Abbreviation: NA, data not available.

*The numbers may not add to up to the number of persons screened because of item nonresponse. Percentages are weighted estimates to account for the sampling strategy and may not add to 100% due to rounding.

†Because colonoscopy and sigmoidoscopy are performed less frequently, the questions were asked differently. Fifty-six percent reported that they planned to have another test performed within the next 5 years.

‡For Papanicolaou test, respondents were asked “How would you respond if your doctor told you that the benefit of Pap smears (Papanicolaou test) would be the same if you had them less often than you do now, and recommended that you have them less often? Would you agree to have Pap smears less often or would you try to keep having them as often as you do now? The question was not asked in regard to mammography because of strong negative reactions to the question in focus groups. For colonoscopy or sigmoidoscopy, respondents were asked “How would you respond if your doctor recommended that you not have routine [tests]? Would you agree not to have [test] or would you try to keep having them?” Note because of skip pattern error, 70 eligible respondents were not asked this question about colonoscopy.

time they would stop being tested. This enthusiasm is not dampened by false-positive test results. While nearly half

the respondents who had experienced a false-positive result described the episode as extremely scary, virtually all were glad they had had the original screening test.

Because it is a new and highly visible technology,¹⁵ we specifically asked respondents about total-body CT screening. There are no data to support the benefit (or even safety) of total-body CT screening, and it is not endorsed by any professional medical organization.²⁰ In fact, total-body CT screening is actually discouraged by the American College of Radiology and the American Association of Physicians in Medicine.^{21,22} Nevertheless, total-body CT scans are directly and aggressively marketed to consumers. While there have been a number of media reports about total-body CT,²³⁻²⁵ our study is the first to systematically document the substantial public interest: almost three quarters would choose such test-

ing instead of receiving \$1000 in cash.

Our findings should be interpreted in light of several potential limitations. First, since we used the telephone to select our respondents, the 5% of adults living in households without telephone service²⁶ are not represented. Next, while our response rate was good—72% among individuals known to be eligible and 51% among those estimated to be eligible—systematic bias between respondents and nonrespondents is still possible. This concern is lessened by the fact that our sample's demographics and screening rates closely approximated official US Census statistics. Although the elderly and persons with less formal education were underrepresented in our sample, stratified analyses demonstrated that the beliefs examined did not differ importantly from these characteristics. In addition, our findings about false-positive PSA test results are based

Figure 2. Screening as an Obligation

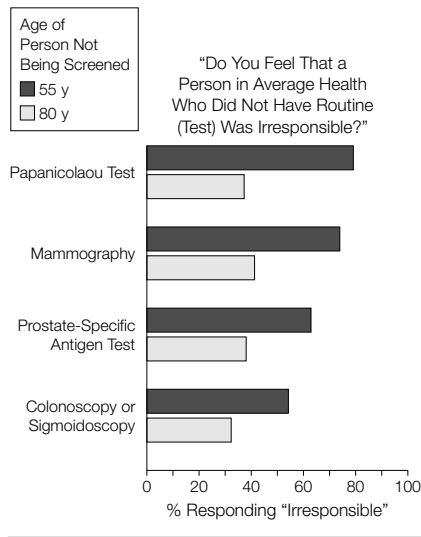


Table 4. Experience of Persons Who Have Had False-Positive Screening Results

	No.* for Papanicolaou Test (Weighted %†) (n = 103)	No.* for Mammography (Weighted %†) (n = 109)	No.* for Prostate-Specific Antigen Test (Weighted %†) (n = 10)
How many [test] results have you had that required further testing?‡			
1	56 (55)	71 (68)	6 (59)
2	30 (29)	28 (24)	1 (12)
≥3	15 (16)	9 (8)	3 (29)
How many days or weeks were there between when you got the original [test] result and when you found out you did not have cancer?			
≤1 wk	24 (23)	34 (36)	1 (7)
1-2 wk	26 (30)	31 (33)	2 (27)
3-4 wk	20 (22)	17 (18)	1 (20)
>1 mo	26 (25)	13 (13)	3 (34)
How scary was that time for you?			
Scariest time of my life	10 (11)	8 (8)	3 (29)
Very scary	33 (32)	32 (29)	3 (29)
Somewhat scary	24 (25)	36 (33)	4 (41)
A little scary	30 (28)	23 (22)	0
Not scary at all	5 (5)	8 (8)	0
Looking back on your experience, even though you had a result that required further testing, are you glad that you had that [test]?			
No	1 (1)	4 (4)	0
Yes	102 (99)	104 (96)	10 (100)
Since that result, are you now having [tests]?			
Less frequently	14 (12)	9 (10)	1 (12)
Same as before	77 (80)	79 (73)	6 (65)
More frequently	9 (8)	17 (18)	3 (24)

*Numbers may not add to the number of persons who have had false-positive screening tests because of item nonresponse.

†Percentages are weighted estimates to account for the sampling strategy and may not add to 100% due to rounding.

‡Follow-up testing was required: Papanicolaou: repeat test, 94%; colposcopy, 46%; biopsy, 27%; cryosurgery, 44%. Mammography: repeat mammography, 69%; ultrasound, 49%; biopsy, 35%. Prostate-specific antigen test: repeat test, 65%; ultrasound, 65%; biopsy, 80%.

on only 10 men and should be interpreted cautiously.

Our findings are also limited because they cannot tell us exactly why people living in the United States are so enthusiastic about screening. Our data do, however, argue against one important possibility—that enthusiasm stems from an exaggerated sense of cancer risk. We asked a variety of questions to understand cancer risk perceptions and found no evidence of a widespread overestimation of cancer risk. Instead we found that most individuals believe they are at average or lower risk for each of the cancers considered, report that they worry “a little” or “not at all” about getting cancer, and recognize that cancer is typically not a rapidly fatal disease (data not shown).

Our work suggests that screening is not seen as a choice but as an obligation. The idea that “you owe it to your children to be screened” and that it “would be selfish” to forgo screening was expressed repeatedly in our focus groups. This sentiment was borne out in the survey: two thirds, for example, believed that a 55-year-old person who did not have routine screening was “irresponsible.” While the sense of obligation may, in part, stem from the intuitive appeal of early detection (ie, everyone knows that “an ounce of prevention is worth a pound of cure”), other factors are at work.

Health care marketing has created an environment in which screening is portrayed as the safest course of action. Screening has long been marketed as the preeminent weapon in the war on cancer.²⁷ In the name of improved population health, many well-meaning public health agencies and disease advocacy groups use powerful messages to persuade individuals to undergo screening with slogans like “take the test not the chance” or “don’t be a victim” or by the use of fear- and guilt-inducing images (eg, a picture of the young children who lost an unscreened parent to cancer). Other efforts to promote screening may be more self-interested. For example, an increasing number of independent total-body CT scan

centers market themselves directly to the public with slogans like “new technology that could save your life”; these advertisements are often accompanied by personal anecdotes from individuals who believe their lives were saved by the early diagnosis of an unsuspected tumor. Regardless of the source of the message, the net effect is the same: screening is always seen as the right thing to do.

Ironically, even what physicians see as the important harms of screening—false-positive results and detection of pseudodisease—reinforce the apparent case for screening. Virtually everyone who had a false-positive test result in our survey was glad they had been tested and intended to be tested again. Apparently, the relief experienced when the confirmatory test result comes back negative overwhelms the substantial fear that came before. Even pseudodisease—often taken to be the most important harm of screening because it results in the unnecessary diagnosis and treatment of cancer—may reinforce enthusiasm for screening: more people appear to have cancer (prevalence increases because “occult” cancers are detected) and prognosis improves (due to lead time and overdiagnosis biases).²⁸

Some clinicians will see our results as welcome evidence of the success of public health campaigns for widely recommended cancer screening tests. Others will have quite a different take. They will see disturbing evidence that these same campaigns have communicated a misleadingly simple and 1-sided message—a message that discourages meaningful discussions about the use of these tests in settings when the recommendations are less clear (eg, screening at younger ages, at advanced age, or for individuals with multiple comorbidities).²⁹

However, we would hope that everyone can agree that these messages have an undesirable adverse effect: a public that is primed to believe there is value in having any test that is marketed as being able to find early cancer. In the case of unproven tests such as total-body CT, excessive enthusi-

asm makes it extremely easy for exaggerated marketing tactics to succeed. Consequently, some have suggested that the government replicate what it has done with pharmaceutical advertising and regulate the direct-to-consumer advertising of unproven tests,³⁰ requiring that the advertisements are factually true and provide balanced information about benefit and harm.³¹

But there are limits to what physicians should expect from governmental intervention. The public’s enthusiasm for cancer screening and resistance to do less stems in large part from messages the medical establishment itself has promulgated. Unfortunately, these messages have helped create an environment that hinders discourse on the prudent use of existing tests and is ripe for the premature diffusion of new ones. The challenge now is to balance messages and reduce the public’s risk for overtesting and overtreatment.

Author Contributions: Drs Schwartz and Woloshin had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis.

Study concept and design: Schwartz, Woloshin, Welch.

Acquisition of data: Schwartz, Woloshin, Fowler.

Analysis and interpretation of data: Schwartz, Woloshin, Fowler, Welch.

Drafting of the manuscript: Schwartz, Woloshin, Welch.

Critical revision of the manuscript for important intellectual content: Schwartz, Woloshin, Fowler, Welch.

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It is by undermining the idea of reason, of order, of harmony, that we gain consciousness of ourselves.

—B. M. Cioran (1911-)