Enthusiasm for Cancer Screening in the United States

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There 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. 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 years or even for women at any age; questions have been raised about how often to be screened for cervical cancer, and whether to be screened at all for prostate or lung cancer. 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.

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, or even lick a stamp without seeing a public service announcement promoting some form of cancer screening. Most recently, aggressive direct to consumer advertising is bringing a variety of new advanced, but unproven screening tests including brain magnetic resonance imaging, lung and total-body computed tomographic (CT) screening, and genetic testing for "cancer genes" to the public.

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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most cancer screening is recom-

mended (a notable exception being Pa-

nomicolaou 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 ob-

tain a national probability sample of

households in the continental United

States with telephone service. FIGURE 1
details the steps of our sampling pro-

cedure. The process began with the gen-

eration of a random list of 4000 US tele-

phone numbers for the goal of 500

completed interviews. From this list,

1702 working residential telephone

numbers were identified. Interviewers

successfully completed a 3-minute “screen-

ing” interview with an English-

speaking adult at 1208 of the resi-

dences to identify individuals meeting

study criteria. At least one eligible adult

resided in 697 of the households (if ≥1

eligible adult was identified, a com-

puter selected a respondent so that each

eligible person had an equal chance of

being selected). A total of 500 individu-

als completed the interview.

There is some debate in the survey

research literature about how best to
calculate a response rate in this set-
ting. The specific question is whether
to account for residences that could not
be screened. To maximize transpar-

cency of this issue, the American Asso-
ciation of Public Opinion Research17

suggests calculating 2 response rates us-
ings 2 different denominators. The sim-
ples approach (commonly seen in the

literature) is to ignore unscreened resi-
dences and use known eligible house-

holds 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 cer-
tainly some eligible households among
those not screened. The second ap-

proach attempts to account for this by
increasing the denominator to in-
clude the estimated number of eligible
households among unscreened house-
holds. This estimate takes the propor-
tion 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 ob-
tained 500 responses from an esti-
mated 984 (697 + 287) eligible house-
holds—providing responses from 51% of
those estimated to be eligible
(N=500).

Interview Protocol

Development. To learn how the pub-
ic thinks about screening, we con-
ducted 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 collabora-
tion with experts at the Center for Sur-
vey Research, a professional survey re-
search firm affiliated with the University
of Massachusetts. A draft survey in-
strument was developed based on the
results of the focus groups. Experi-
cenced interviewers then conducted 10
cognitive interviews to ensure that the
questions were understood and that the
answers were meaningful. After revis-
ing the draft based on this feedback, 17
eligible adults identified by random
digit dialing completed the survey; these
interviews were audi-taped and then
coded to identify questions that were
difficult for interviewers to read or for
respondents to answer. Final re-
visions 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 de-
tection, worry about cancer, and inter-
est 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-

METHODS

Sample Selection

Our goal was to interview a nationally
representative sample of adults for
whom screening for cancer was rele-
vant. Because our focus was on screen-
ing, we specifically targeted a screen-
eligible population. Thus, we excluded
individuals with a history of cancer be-
cause a prior cancer diagnosis may
change how one thinks about screen-
ing and early detection. We further re-
stricted 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-

Figure 1. Survey Sample

4000 Random US Telephone Numbers
2986 Unusable
483 Business
1539 Not Working Number
276 No Contact*

1702 Working Residential Telephone Numbers
494 Unscreened
247 Refusals
57 Language Barrier
90 Other (eg, No Contact)*

1208 Screening Interviews Completed
511 Ineligible Households
460 Age
51 Cancer

697 Had ≥1 Eligible Adult in Household
197 Nonparticipants
120 Refusals
12 Language Barrier
65 Other

500 Interviews Completed
360 Women Aged ≥40 y
140 Men Aged ≥50 y

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

tests. Specifically, we explored gen-
eral beliefs about early detection, per-
sonal commitment to screening, screen-
ing as an obligation, attitudes toward
false-positive results, and desire for
testing.

RESULTS

Sample Characteristics

The survey consisted of 500 com-
pleted interviews, which we consid-
ered a nationally representative sam-
ple of US adults aged 40 years or
older. Of the 500 respondents, 317
(63.4%) were women, and 183 (36.6%)
were men. The sample was 86.4% non-
Hispanic white, 8.0% African Ameri-
can, 4.4% Hispanic, and 1.2% Asian.
About 44% of the respondents aged
40 to 59 years, 37% aged 60 to 79
years, and 19% aged 80 years or
older. Fifty-one percent of the respon-
dents were married, and 51.6% had
completed some college or more.
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 survey; 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, ±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
If there was a kind of cancer for which nothing can be done, would you 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.

**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 would be irresponsible: ranging from 41% for mammography (our findings suggest 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.

**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 mammograms, and 25% of men with false-negative tests; 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 Survey 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 overrule 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.

**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 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 overrule 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.

**General Beliefs About Early Detection**

Table 2. General Beliefs About Early Detection

<table>
<thead>
<tr>
<th>Response</th>
<th>No. of Survey Respondents (Weighted %†) [N = 500]</th>
</tr>
</thead>
<tbody>
<tr>
<td>How often does finding cancer early mean that treatment saves lives?</td>
<td></td>
</tr>
<tr>
<td>None of the time</td>
<td>10 (3)</td>
</tr>
<tr>
<td>Some of the time</td>
<td>122 (24)</td>
</tr>
<tr>
<td>Most of the time</td>
<td>287 (58)</td>
</tr>
<tr>
<td>All of the time</td>
<td>79 (16)</td>
</tr>
<tr>
<td>How often does finding cancer early mean that a person can have less treatment?</td>
<td></td>
</tr>
<tr>
<td>None of the time</td>
<td>16 (3)</td>
</tr>
<tr>
<td>Some of the time</td>
<td>220 (44)</td>
</tr>
<tr>
<td>Most of the time</td>
<td>195 (42)</td>
</tr>
<tr>
<td>All of the time</td>
<td>52 (11)</td>
</tr>
<tr>
<td>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?</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>64 (34)</td>
</tr>
<tr>
<td>Yes</td>
<td>325 (66)</td>
</tr>
<tr>
<td>Have you ever heard of cancers that grow so slowly that they are unlikely to cause you problems in your lifetime?</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>248 (48)</td>
</tr>
<tr>
<td>Yes</td>
<td>251 (52)</td>
</tr>
<tr>
<td>Would you want to be tested to see if you had a slow-growing cancer like that?</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>201 (44)</td>
</tr>
<tr>
<td>Yes</td>
<td>288 (56)</td>
</tr>
<tr>
<td>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?</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>57 (13)</td>
</tr>
<tr>
<td>Yes</td>
<td>439 (87)</td>
</tr>
<tr>
<td>In the past, do you think you have had too many routine screening tests for cancer, too few tests, or about the right number?</td>
<td></td>
</tr>
<tr>
<td>Too few</td>
<td>171 (35)</td>
</tr>
<tr>
<td>About the right number</td>
<td>304 (64)</td>
</tr>
<tr>
<td>Too many</td>
<td>10 (2)</td>
</tr>
</tbody>
</table>

*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.
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 Pap 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 percent 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.

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

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

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

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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, 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. In fact, total-body CT screening is actually discouraged by the American College of Radiology and the American Association of Physicists in Medicine. 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, our study is the first to systematically document the substantial public interest: almost three quarters would choose such testing 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 service 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

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

<table>
<thead>
<tr>
<th>Test Type</th>
<th>No. of Persons</th>
<th>How many [test] results have you had that required further testing?</th>
<th>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?</th>
<th>How scary was that time for you?</th>
<th>Looking back on your experience, even though you had a result that required further testing, are you glad that you had that [test]?</th>
<th>Since that result, are you now having [tests]?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Papanicolaou Test</td>
<td>56 (55)</td>
<td>24 (23)</td>
<td>10 (11)</td>
<td>102 (99)</td>
<td>14 (12)</td>
<td>77 (80)</td>
</tr>
<tr>
<td>Mammography</td>
<td>71 (68)</td>
<td>26 (30)</td>
<td>33 (32)</td>
<td>8 (8)</td>
<td>9 (10)</td>
<td>79 (73)</td>
</tr>
<tr>
<td>Prostate-Specific Antigen Test</td>
<td>6 (59)</td>
<td>34 (36)</td>
<td>32 (29)</td>
<td>4 (4)</td>
<td>3 (34)</td>
<td>79 (73)</td>
</tr>
</tbody>
</table>

*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, 33%. Prostate-specific antigen test: repeat test, 65%; ultrasound, 65%; biopsy, 89%.
on only 10 men and should be inter-
preted cautiously.

Our findings are also limited be-
cause they cannot tell us exactly why
people living in the United States are
so enthusiastic about screening. Our
data do, however, argue against one im-
portant possibility—that enthusiasm
stems from an exaggerated sense of can-
cer risk. We asked a variety of ques-
tions to understand cancer risk percep-
tions and found no evidence of a
widespread overestimation of cancer
risk. Instead we found that most indi-
viduals believe they are at average or
lower risk for each of the cancers con-
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 obliga-
tion. 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 “ir-
responsible.” While the sense of obli-
gation may, in part, stem from the in-
tuitive appeal of early detection (ie,
everyone knows that “an ounce of pre-
vention is worth a pound of cure”),
other factors are at work.

Health care marketing has created an
environment in which screening is por-
trayed as the safest course of action.
Screening has long been marketed as
the preeminent weapon in the war on can-
cer. In the name of improved popu-
lation health, many well-meaning pub-
lic health agencies and disease advocacy
groups use powerful messages to per-
suade individuals to undergo screen-
ing 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 chil-
dren who lost an unscreened parent to
cancer). Other efforts to promote
screening may be more self-inter-
ested. For example, an increasing num-
ber of independent total-body CT scan
centers market themselves directly to
the public with slogans like “new tech-
nology that could save your life”; these
advertisements are often accompa-
nied by personal anecdotes from indi-
viduals who believe their lives were
saved by the early diagnosis of an un-
suspected 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 appar-
cent case for screening. Virtually every-
one who had a false-positive test re-
sult in our survey was glad they had
been tested and intended to be tested
again. Apparently, the relief experi-
enced when the confirmatory test re-
sult 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 di-
agnosis and treatment of cancer—
may reinforce enthusiasm for screen-
ing: more people appear to have cancer
(prevalence increases because “oc-
cult” cancers are detected) and prog-
nosis improves (due to lead time and
overdiagnosis biases).

Some clinicians will see our results as
welcome evidence of the success of pub-
lic health campaigns for widely recom-
mented cancer screening tests. Others
will have quite a different take. They will
see disturbing evidence that these same
campaigns have communicated a mis-
leadingly simple and 1-sided mes-
sage—a message that discourages mean-
ningful discussions about the use of these
tests in settings when the recommenda-
tions are less clear (eg, screening at
younger ages, at advanced age, or for
individuals with multiple comorbidities).

However, we would hope that ev-
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 mar-
keted as being able to find early can-
cer. In the case of unproven tests such
as total-body CT, excessive enthusi-
asm makes it extremely easy for exag-
gerrated marketing tactics to succeed.
Consequently, some have suggested
that the government replicate what it
has done with pharmaceutical adver-
tising and regulate the direct-to-
customer advertising of unproven
tests, requiring that the advertise-
ments are factually true and provide bal-
anced information about benefit and
harm.

But there are limits to what physici-
s should expect from government-
tal intervention. The public’s enthusi-
asm for cancer screening and resistance
to do less stems in large part from mes-
ages the medical establishment itself
has promulgated. Unfortunately, these
messages have helped create an envi-
ronment 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 mes-
ages and reduce the public’s risk for
overtesting and overtreatment.

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ponsibility for the integrity of the data and the ac-
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