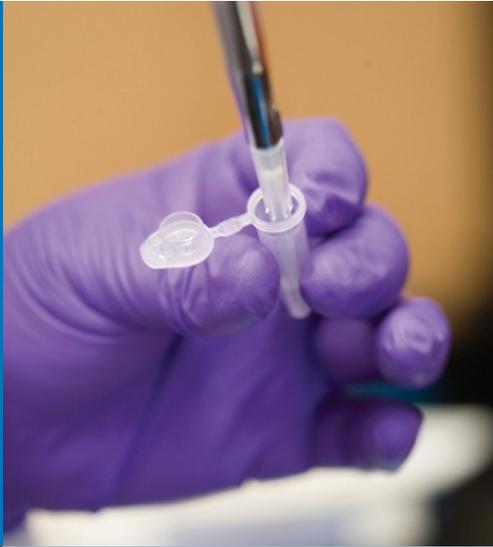


INSURANCE
COVERAGE
FOR CANCER
SCREENING



WOMEN'S
PREVENTIVE
SERVICES

Current Topics in Access to Cancer Screening

BENEFIT OF
EARLY CANCER
DETECTION



MEDICARE
BENEFICIARIES
WITH PROSTATE
CANCER



LISTENING TO
WOMEN: BREAST
IMAGING



STOP CANCER BEFORE IT STARTS!™

***Talk to your healthcare provider about
which screening tests are right for you.***

www.PreventCancer.org

prevent  cancer
FOUNDATION

Welcome...

Improved cancer screening is one of the greatest public health achievements of our time and early detection of cancer is best achieved when patients have ready access to screening. However, guidelines by three leading U.S. organizations differ with respect to a number of cancer screening recommendations, and coverage of cancer screening is not the same in all health care plans.

To better understand the landscape of insurance coverage for cancer screening, the Prevent Cancer Foundation analyzed coverage by the 30 largest public and private U.S. health insurance plans for screening tests for breast, cervical, colorectal, lung, and prostate cancers. Our results are reported in the accompanying paper, “Cancer Screening: Guidelines and Insurance Coverage.”

Following the paper in this ebook are selected studies which examine the impact of cancer screening on patient outcomes. “Increasing Receipt of Women’s Preventive Services” by Stolp and Fox highlights critical gaps in the delivery of preventive services to women and suggests

opportunities to improve utilization. “Understanding Perceived Benefit of Early Cancer Detection: Community-Partnered Research with African American Women in South Los Angeles” by Bazargan et al. finds that a substantial proportion of African American women are not aware of the benefits of early detection. “Association Between Types of Chronic Conditions and Cancer Stage at Diagnosis among Elderly Medicare Beneficiaries with Prostate Cancer” by Raval et al. recommends strategies to reduce the risk of advanced prostate cancer. “Listening to Women: Expectations and Experiences in Breast Imaging” by Harvey et al. highlights opportunities to improve women’s access to and understanding and use of screening mammography.

This ebook explores the current complexities of “getting people screened according to guidelines” and points out how access to screening is impacted. The Prevent Cancer Foundation invites you to visit its website, preventcancer.org, to learn more about the Foundation’s commitment to cancer prevention and early detection nationwide.

Contents

- 5** Cancer Screening: Guidelines and Insurance Coverage
Prevent Cancer Foundation, Madeline Drexler, and Margaret Jamieson
- 21** Increasing Receipt of Women's Preventive Services
Haley Stolp and Jared Fox
- 33** Understanding Perceived Benefit of Early Cancer Detection: Community-Partnered Research with African American Women in South Los Angeles
Mohsen Bazargan, Anna Lucas-Wright, Loretta Jones, Roberto Vargas, Jaydutt V. Vadgama, Shirley Evers-Manly, and Annette E. Maxwell
- 42** Association Between Types of Chronic Conditions and Cancer Stage at Diagnosis among Elderly Medicare Beneficiaries with Prostate Cancer
Amit D. Raval, Suresh Madhavan, Malcolm D. Mattes, and Usha Sambamoorthi
- 53** Listening to Women: Expectations and Experiences in Breast Imaging
Susan Harvey, Aimee M. Gallagher, Martha Nolan, and Christine M. Hughes

Cancer Screening: Guidelines and Insurance Coverage

Prevent Cancer Foundation, Madeline Drexler,¹ and Margaret Jamieson²

Introduction

The Benefits of Cancer Screening

Medicine’s ability to detect the earliest forms of cancer while the disease is still treatable—and often curable—is a modern public health milestone, and the technologies that make this success possible are being refined continually. Indeed, the United States (U.S.) Centers for Disease Control and Prevention (CDC) called improved cancer screening one of “The Great Public Health Achievements” of the first decade of the 21st century, particularly in regard to colorectal, breast, and cervical cancers.¹

However, cancer remains the second-leading cause of death in the U.S.² In 2016, an estimated 1,685,210 people will be diagnosed with cancer, and 595,690 will die of the disease.³ The goal of reliably detecting cancer before symptoms are noticeable, and when

timely treatment makes a proven difference in survival, has yet to be reached on a broad scale.

Strong scientific backing for the benefits of evidence-based cancer screening makes this goal more urgent. Starting in approximately 1989, for example, breast cancer mortality rates in the U.S. began to decline markedly by about 2% per year—the first time in half a century that the death rate fell, with larger declines in women younger than 50.⁴ Today, 35% fewer women die each year from breast cancer than would have died if the 1989 death rate had remained unchanged.⁴ These declines are attributed to early detection through screening and improved treatment, especially adjuvant therapy.

Even more noteworthy is the highly effective strategy of preventing colorectal cancer by identifying and removing colorectal adenomas. Fortunately, rates of screening of the colorectum (especially colonoscopy) have increased substantially over the past quarter

century.⁵ Largely as a result, rates of new colorectal cancer cases and deaths among adults aged 50 years or older are decreasing in the U.S.⁶ Likewise, Pap screening for cervical cancer—once one of the major causes of death among U.S. women of childbearing age—has dramatically reduced both the number of new cases of cervical cancer and the number of deaths since 1950.^{7,8}

The keys to a successful cancer screening program are physicians recommending to patients that they be screened and patients’ compliance with screening recommendations.⁹ Physicians should facilitate informed and/or shared decision-making for their patients—a conversation that, in some cases, will center on uncertainty about the balance of benefits and harms.

However, two challenges may be undermining compliance. One is that national agencies and professional groups have published conflicting screening guidelines—an inconsistency that stems in part from a lack of clarity

¹Harvard Public Health, Harvard T.H. Chan School of Public Health, Boston, MA.

²Policy Reporter, Chicago, IL.

or disagreement in interpretation about the relative benefits and harms of screening for certain malignancies. The other potential obstacle to screening compliance is that insurers are inconsistent in the screening options that they cover. Patients' confusion about how or whether to be screened may be compounded, in some cases, by the stress of either looking for a plan with adequate coverage or of paying out of pocket.

To address these challenges, this white paper summarizes current screening options for the five cancers for which screening is currently most common in the U.S., provides an overview of screening guidelines by three leading national organizations and compares screening coverage by the 30 largest health insurers. The implications of the conflicts in guidelines and inconsistencies across plans in coverage, for individuals and across the realm of public health, are explored in the discussion.

Cancer Screening Tests

Breast cancer

*2016 estimates: 249,260 new cases and 40,890 deaths in the U.S.*³

Mammography, an X-ray of the breast, is the most common screening test for breast cancer. It plays a

central role in early detection of breast cancer because it can reveal changes in the breast up to two years before a patient or physician can feel them.¹⁰

Today, there are several improved technologies for breast cancer screening:

In **digital mammography**, X-ray film is replaced by a digital detector. These systems provide sharper pictures with a lower radiation dose.¹⁰

Tomosynthesis, also known as digital breast tomosynthesis (DBT), was approved by the U.S. Food and Drug Administration (FDA) in 2011 to be used in combination with full-field digital mammography for breast cancer screening and diagnosis.¹¹ This technology acquires low-dose X-ray images from multiple angles during a short scan and reconstructs the images into a series of high-resolution “slices.” Clinical studies have consistently shown that tomosynthesis both increases breast cancer detection and decreases false recalls.^{4 12 13 14 15} Research suggests that while tomosynthesis improves breast cancer screening for nearly all women, the benefits may be especially pronounced in women with dense breast tissue.^{16 17}

Magnetic resonance imaging and **breast ultrasound** can be used for supplemental screening

in high-risk women and women with dense breast tissue.^{18 19}

Cervical cancer

*2016 estimates: 12,990 new cases and 4,120 deaths in the U.S.*³

Cervical cancer is the easiest gynecologic cancer to prevent, with regular screening tests and follow-up.²⁰ The **Pap test** (or **Pap smear**), one of the most reliable and effective cancer screening tests available, looks for precancers—cell changes on the cervix that might become cancer if not treated appropriately.²⁰ During a Pap test, a speculum is inserted into the vagina and a brush is then used to collect cervical cells, which are examined under a microscope for signs of disease.⁷

A clinician may order an **HPV test** in conjunction with a Pap test (also known as co-testing) to identify possible infection caused by one of several types of human papillomavirus linked to cervical cancer. Screening with both the Pap test and the HPV test has been shown to reduce the number of new cervical cancer cases.⁷

Colorectal cancer

*2016 estimates: 134,490 new cases of colorectal cancer and 49,190 deaths in the U.S.*³

Most colorectal cancers begin as a polyp, a growth

in the inner lining of the colon or rectum. Polyps are common in people older than 50 years of age, and most will not develop into cancer. However, a certain type of polyp known as an adenoma carries a higher risk of becoming cancerous, particularly if it is large. Because several screening tests identify growths that can be removed before they become dangerous, colorectal cancer screening is a form of cancer prevention as well as early detection.⁶

High-sensitivity stool-based (fecal-occult) blood tests (FOBT) check for tiny amounts of blood in the stool that cannot be seen visually, but which may be caused by bleeding polyps or cancer. Currently, three types of stool-based tests are approved by the FDA to screen for colorectal cancer:⁶

- **Guaiac FOBT (gFOBT)** uses a chemical to detect heme, a component of the blood protein hemoglobin.
- **Fecal immunochemical test (FIT, also known as iFOBT)** uses antibodies to detect human globin protein.
- The **stool DNA test (FIT-DNA)**, is a multitarget test that detects tiny amounts of blood in stool (FIT) as well as nine DNA biomarkers in three genes that have

been found in colorectal cancer and precancerous advanced adenomas.

People who have positive findings with any stool-based test are advised to follow up with a timely colonoscopy.^{6,21}

In **sigmoidoscopy**, the rectum and sigmoid colon are examined using a sigmoidoscope, a flexible lighted tube with a lens for viewing and a tool for removing tissue. During sigmoidoscopy, abnormal growths in the rectum and sigmoid colon can be biopsied.⁶ This modality does not reach the transverse colon or cecum, and therefore does not examine the entire colon.

During **colonoscopy**, the rectum and entire colon are examined using a colonoscope, a longer, flexible lighted tube with a lens for viewing and a tool for removing tissue. Any abnormal growths in the colon and the rectum can be biopsied or removed, including growths in the upper parts of the colon that are not reachable by sigmoidoscopy.⁶

Virtual colonoscopy (also called **CT colonography**), uses a CT scanner to produce a series of images of the colon and the rectum from outside the body. A computer then assembles these pictures into detailed images that can show polyps, cancer, and other abnormalities.

Virtual colonoscopy is less invasive than standard colonoscopy and does not require sedation. If polyps or other abnormal growths are found during a virtual colonoscopy, a standard colonoscopy is performed to remove or biopsy them.⁶

Lung cancer

2016 estimates: 224,390 new cases and 158,080 deaths in the U.S.³

Symptoms of lung cancer usually do not appear until the disease is already at an advanced, non-curable stage.²² The only recommended screening test for lung cancer is **low-dose computed tomography** (also called a **low-dose CT scan, or LDCT**). This test uses low doses of radiation to make detailed pictures of the lungs. Radiation from repeated LDCT tests can cause cancer in otherwise healthy people and LDCT often detects benign, non-cancerous findings, which may result in follow-up invasive testing.²³

Prostate cancer

2016 estimates: 180,890 new cases and 26,120 deaths in the U.S.³

Prostate-specific antigen, or PSA, is a protein produced

by cells of the prostate gland. **The PSA test** measures the level of PSA in a man's blood, using a blood sample that is sent to a laboratory for analysis. The results are usually reported as nanograms of PSA per milliliter (ng/mL) of blood.²⁴

The blood level of PSA is often elevated in men with prostate cancer, and the PSA test was originally approved by the FDA in 1986 to monitor the progression of prostate cancer in men who had already been diagnosed with the disease. In 1994, the FDA approved the use of the PSA test in conjunction with a **digital rectal exam (DRE)** to test asymptomatic men for prostate cancer. Men who report prostate symptoms that may be caused by inflammation or cancer often undergo PSA testing (along with a DRE) to help doctors make a diagnosis.²⁴

There is no specific normal or abnormal level of PSA in the blood. In the past, most doctors considered PSA levels of 4.0 ng/mL and lower as normal. If a man had a PSA level above 4.0 ng/mL, doctors would often recommend a prostate biopsy to determine whether prostate cancer was present. Subsequent research has shown that a number of benign conditions can cause a man's PSA level to rise.²⁴ Predictive biomarkers can be used to

potentially identify aggressive disease in men with borderline PSA levels.^{25 26}

Cancer Screening Guidelines: Weighing Benefits and Harms

According to the National Cancer Institute, for cancer screening to be valuable, at least two criteria must be met. First, a test or procedure must detect cancer earlier than if the cancer were found only after symptoms had developed. Second, there must be evidence that treatment initiated earlier as a consequence of screening leads to a better outcome.²⁷

In addition, the potential benefits of screening must be weighed against the potential harms. Although most cancer screening tests are noninvasive or minimally invasive, some involve small risks of serious complications that may be immediate (e.g., perforation with colonoscopy) or delayed (e.g., potential carcinogenesis from radiation). Other harms include a false-positive test result (which can lead to anxiety and unnecessary invasive diagnostic procedures) and a false-negative result (which may erroneously reassure an individual who will go on to develop clinical signs and symptoms of cancer, thereby delaying diagnosis and effective treatment). Finally,

concerns regarding the potential harm of overdiagnosis—i.e., the diagnosis of a condition that would not have become clinically important had it not been detected by screening—are increasing, as screening tests become more sensitive at detecting tiny tumors.²⁷

The lack of consensus among screening guidelines agencies partly reflects the evolving state of the science, screening modalities, and treatment options, as well as the fact that there is little consensus on what constitutes a harm in screening or where the threshold between benefit and harm lies—such as with breast cancer.²⁸ Moreover, guidelines consider the evidence base to determine *probabilities* across populations, in order to inform decisions about where to invest resources. Individual women and their health care providers, by contrast, focus more on cancer as a *possibility* in a patient's life, a calculation weighted with personal considerations.²⁹

Screening for cervical and colorectal cancer is widely accepted as highly effective. However, for other sites, balancing the benefits and harms of cancer screening is a complex, nuanced, and sometimes subjective judgment. Part of the problem stems from the screening guidelines themselves. A 2016 study found that 69% of cancer prevention and screening recommendation

statements either did not quantify benefits and harms or presented them in an asymmetric manner—i.e., presenting recommendations without explaining benefits, quantifying benefits but not harms, or quantifying benefits and harms in different ways.³⁰

A salient example of the dilemmas posed by current technologies is prostate cancer screening. Until recently, many physicians and professional organizations encouraged yearly PSA screening for men beginning at age 50.²⁴ Some organizations recommended that men at higher risk of prostate cancer—including African American men, and men whose father or brother had prostate cancer—begin screening at age 40 or 45.²⁴ However, as more evidence has accumulated about the benefits and harms of prostate cancer screening, some organizations have begun to caution against routine population screening, whereas others continue to recommend PSA screening.²⁴

A 2014 report sums up these ambiguities. On one hand, the author notes, randomized data show that PSA screening results in earlier stages at diagnosis, improved oncological outcomes after treatment, and lower prostate cancer mortality rates. However, the downsides include unnecessary biopsies due to false-positive PSA tests and

diagnosis of insignificant cancers, which can lead to potentially serious side effects from prostate biopsy and/or prostate cancer surgery. Because of these dilemmas, some groups recommend shared decision making about screening for men with at least a 10-year life expectancy, including a discussion of risks, benefits, uncertainties, and patient preferences.³¹ While the USPSTF recommends against prostate cancer screening for men of all ages as a population-based guideline, it acknowledges that physicians and patients may choose to engage in shared decision making, based on informed choice and patients' values.³²

Although there is general consensus that mammographic screening is beneficial, benefits must be weighed against potential harms such as false-positive mammography results and overdiagnosis.³³ There is particular concern related to potential overdiagnosis of ductal carcinoma in situ (DCIS)—a noninvasive form of breast cancer that comprises a spectrum of abnormal changes that start in the cells lining the breast ducts. While DCIS can lead to invasive cancer, some cases of DCIS may never progress if left untreated. Thus, the detection of DCIS may lead to overtreatment.⁴ Determining the balance between benefits and

harms is complicated by issues such as how to define and quantify potential harms; values and preferences of women in regard to screening; and how all of these considerations vary depending on a woman's age and risk for breast cancer.³³

Such questions and concerns shape current scientific guidelines for cancer screening. It should also be noted that the mandated screenings driven by national guidelines and evaluated by performance measures set by the Healthcare Effectiveness Data and Information Set (HEDIS)³⁴—i.e., those for breast, cervical, colorectal, and lung cancer—should be treated differently than the more general screening advice for prostate cancer (in which population-based screening is not recommended, and individual doctor/patient assessment is advised).

Guidelines from three influential advisory organizations are summarized herein.

United States Preventive Services Task Force (USPSTF)

USPSTF is an independent, volunteer panel of national experts in prevention and evidence-based medicine. The Task Force's screening recommendations apply only to people who have no signs or symptoms of the

disease under evaluation.³⁵ The Task Force assigns each recommendation a letter grade, based on the strength of the evidence and the balance of benefits and harms of a preventive service.³⁶ These grade definitions are as follows:

- A. USPSTF recommends the service. There is a high certainty that the net benefit is substantial. Offer or provide this service.
- B. USPSTF recommends the service. There is a high certainty that the net benefit is moderate or there is moderate certainty that the net benefit is moderate to substantial. Offer or provide this service.
- C. USPSTF recommends selectively offering or providing this service to individual patients based on professional judgment and patient preferences. There is at least moderate certainty that the net benefit is small. Offer or provide this service for selected patients depending on individual circumstances.
- D. USPSTF recommends against the service. There is moderate or high certainty that the service has no net benefit or that the harms outweigh the benefits. Discourage the use of this service.
- I. USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and

harms of the service. Evidence is lacking, of poor quality, or conflicting, and the balance of benefits and harms cannot be determined.³⁶

USPSTF guidelines are especially relevant in light of the Affordable Care Act's requirement that private insurance plans cover evidence-based services for adults that have a rating of "A" or "B" in the current USPSTF recommendations. Plans may cover additional services at their discretion.³⁷

USPSTF Recommendations

Breast:³⁸

- **Grade C:** Women aged 40-49: The decision to start screening should be an individual one.
- **Grade B:** Women aged 50-74: Screen every 2 years.
- **Grade I:** Women \geq age 75: No recommendation. Insufficient evidence.

“For women who are at average risk for breast cancer, most of the benefit of mammography results from biennial screening during ages 50 to 74 y. While screening mammography in women aged 40 to 49 y may reduce the risk for breast cancer death, the number of deaths averted is smaller

than that in older women and the number of false-positive results and unnecessary biopsies is larger. The balance of benefits and harms is likely to improve as women move from their early to late 40s.”³⁸

Cervical:³⁹

- **Grade A:** Screening for cervical cancer in women age 21-65 years with cytology (Pap smear) every 3 years. or
- **Grade A:** Women age 30 to 65 years who want to lengthen the screening interval, screening with a combination of cytology and human papillomavirus (HPV) testing every 5 years.

“The USPSTF concludes that for women age 21 to 65 years, there is high certainty that the benefits of screening with cytology every 3 years substantially outweigh the harms. For women age 30 to 65 years, there is high certainty that the benefits of screening with a combination of cytology and HPV testing (co-testing) every 5 years outweigh the harms.”³⁹

Colorectal:⁴⁰

- **Grade A:** Adults aged 50 to 75 years: Start screening at age 50 and continue until age 75. The risks and benefits of different screening methods vary. Recommended screening methods include stool-based

tests (gFOBT, FIT, FIT-DNA) and direct visualization tests (colonoscopy, CT colonography, flexible sigmoidoscopy, and flexible sigmoidoscopy with FIT).

“The USPSTF found convincing evidence that screening for colorectal cancer in adults aged 50 to 75 years reduces colorectal cancer mortality. The USPSTF found no head-to-head studies demonstrating that any of the screening strategies it considered are more effective than others.”⁴⁰

“The harms of screening for colorectal cancer in adults aged 50 to 75 years are small.”⁴⁰

Lung:⁴¹

• **Grade B:** Adults aged 55-80, with a history of smoking: Annual screening for lung cancer with low-dose computed tomography (LDCT) in adults aged 55 to 80 years who have a 30 pack-year smoking history and currently smoke or have quit within the past 15 years.

“Although lung cancer screening is not an alternative to smoking cessation, the USPSTF found adequate evidence that annual screening for lung cancer with LDCT in a defined population of high-risk persons can prevent a substantial number of lung cancer-related deaths.”⁴¹

“The harms associated with LDCT screening include false-negative and false-positive results, incidental findings, overdiagnosis, and radiation exposure.”⁴¹

Prostate:³²

• **Grade D:** USPSTF recommends against prostate-specific antigen (PSA)-based screening for prostate cancer.

“The reduction in prostate cancer mortality 10 to 14 years after PSA-based screening is, at most, very small, even for men in the optimal age range of 55 to 69 years. The harms of screening include pain, fever, bleeding, infection, and transient urinary difficulties associated with prostate biopsy, psychological harm of false-positive test results, and overdiagnosis. Harms of treatment include erectile dysfunction, urinary incontinence, bowel dysfunction, and a small risk for premature death. Because of the current inability to reliably distinguish tumors that will remain indolent from those destined to be lethal, many men are being subjected to the harms of treatment for prostate cancer that will never become symptomatic. The benefits of PSA-based screening for prostate cancer do not outweigh the harms.”³²

National Comprehensive Cancer Network (NCCN)

NCCN is an alliance of 27 of the leading cancer centers in the U.S. NCCN Guidelines detail the sequential management decisions and interventions that currently

apply to 97 percent of cancer affecting patients in the United States.⁴²

NCCN Guidelines

Breast/Average risk:⁴³

- Age ≥ 25 but < 40 y:
 - Clinical encounter every 1-3 years
 - Breast awareness
- Age ≥ 40 :
 - Annual clinical encounter
 - Annual screening mammogram (category 1)
 - Consider tomosynthesis
 - Breast awareness

Cervical: (NCCN endorses screening guidelines jointly issued in 2012 by the American Cancer Society, the American Society for Colposcopy and Cervical Pathology, and the American Society for Clinical Pathology).⁴⁴

- Aged < 21 y:
 - No screening
- Aged 21-29y:
 - Cytology alone every 3y
- Aged 30-65:
 - HPV and cytology co-testing every 5y (preferred) or

cytology alone every 3y (acceptable)

- Aged >65:
 - No screening following adequate negative prior screening

Colorectal: Average risk:⁴⁵

- Age ≥ 50
 - Colonoscopy
- or
- Stool-based:
 - » High-sensitivity guaiac-based or immunochemical-based testing
 - » DNA-based testing
- or
- Flexible sigmoidoscopy plus or minus interval guaiac-based or immunochemical-based testing at year³
- or
- CT colonography

Lung: High risk:⁴⁶

- Age 55-74y and ≥ 30 -pack-year history of smoking and smoking cessation <15y
- or

- Age ≥ 50 y and ≥ 20 pack-year history of smoking and one additional risk factor:
 - In candidates for screening, shared patient/physician decision making is recommended, including a discussion of benefits/risks.

Prostate:⁴⁷

- Baseline evaluation includes history and physical
- Risk assessment:
 - Start risk and benefit discussion about offering prostate screening:
 - » Baseline PSA
 - » Consider baseline digital rectal examination (DRE)
- Age 45-75y:
 - PSA < 1 ng/ml, DRE normal (if done): Repeat testing at 2-4 year intervals
 - PSA 1-3 ng/ml, DRE normal (if done): Repeat testing at 1-2 year intervals
 - PSA >3 ng/ml, or very suspicious DRE: See indications for biopsy
 - PSA <3 ng/ml, DRE normal (if done), and no other indications for biopsy: Repeat testing in select patients at 1-4 year intervals

American Cancer Society (ACS)

Each year, ACS publishes a summary of its guidelines for early cancer detection along with a report on data and trends in cancer screening rates and select issues related to cancer screening.⁴⁸

ACS Guidelines⁴⁹

Breast:

- Women ages 40 to 44 should have the choice to start annual breast cancer screening with mammograms if they wish to do so.
- Women age 45 to 54 should get mammograms every year.
- Women 55 and older should switch to mammograms every 2 years, or can continue yearly screening.
- Screening should continue as long as a woman is in good health and is expected to live 10 more years or longer.

Cervical:

- Cervical cancer testing should start at age 21. Women under age 21 should not be tested.
- Women between the ages of 21 and 29 should have a Pap test done every 3 years. HPV testing should not

be used in this age group unless it is needed after an abnormal Pap test result.

- Preferred approach: Women between the ages of 30 and 65 should have a Pap test plus an HPV test (“co-testing”) every 5 years. Acceptable: Pap test alone every 3 years.
- Women over age 65 who have had regular cervical cancer testing in the past 10 years with normal results should not be tested for cervical cancer.

Colorectal:

- Starting at age 50, both men and women should follow one of these testing plans:
 - Tests that find polyps and cancer
 - » Flexible sigmoidoscopy every 5 years*, or
 - » Colonoscopy every 10 years, or
 - » Double-contrast barium enema every 5 years*, or
 - » CT colonography (virtual colonoscopy) every 5 years*
 - Tests that mostly find cancer
 - » Yearly guaiac-based fecal occult blood test (gFOBT)*, or
 - » Yearly fecal immunochemical test (FIT)*, or

» Stool DNA test (sDNA) every 3 years*

* If the test is positive, a colonoscopy should be done.

Lung:

- 55 to 74 years of age, in good health, have at least a 30 pack-year smoking history and are either still smoking or have quit within the last 15 years
 - Screening with an annual low-dose CT scan (LDCT) of the chest.

Prostate:

- Starting at age 50, men should talk to a health care provider about the pros and cons of testing so they can decide if testing is the right choice for them.
- Men who are African American, or have a father or brother who had prostate cancer before age 65, should have this talk with a health care provider starting at age 45.

These three sets of national guidelines differ on a number of recommendations. For example, while the USPSTF recommends against PSA-based screening for prostate cancer, the ACS advises that men, starting at age 50, talk to their health care providers about the pros and cons of testing. While the USPSTF advises women to have biannual mammography screening starting at age 50, the NCCN and ACS recommend annual

mammography screening (the former, starting at age 40 and the latter, at age 45). The NCCN advises women and their doctors to consider tomosynthesis as a screening modality for breast cancer, whereas the USPSTF and ACS do not. Such variability among guidelines has the potential to cause confusion among physicians, patients, and insurers.

Medicare Coverage for Cancer Screening

Centers for Medicare and Medicaid Services

Medicare is a government-funded health insurance program that covers people ages 65 and over, as well as younger people with disabilities. Medicare coverage for cancer screening is especially important because cancer is the second-leading cause of death among persons 65 and older.⁵⁰ Since the Affordable Care Act (ACA) passed in 2010, certain prevention and early detection services, which are covered by Medicare Part B, do not require cost sharing on the part of the Medicare beneficiary.⁵¹

Medicare Coverage⁵¹

Breast:

- One screening mammogram every 12 months for

all women 40 and older. Medicare also covers breast tomosynthesis.

Cervical:

- One Pap test and pelvic exam every 24 months for women at average risk for cervical cancer.
- As of 2015, Medicare’s cancer screening coverage information does not list HPV testing as a covered screening test for cervical cancer.

Colorectal:

- Screening tests in people 50 and older at average risk for colorectal cancer. Covered tests include FOBT, flexible sigmoidoscopy, colonoscopy, barium enema, and stool DNA test.

Lung:

- Screening with a low-dose CT scan once per year for individuals who are 55-77 years old, have a tobacco smoking history of at least 30 pack years, and either continue to smoke or have quit smoking within the last 15 years.

Prostate:

- For men over age 50, one DRE and one PSA blood test every 12 months.

Insurance Coverage Survey Methods

Policy Reporter, a payer policy analysis company, performed a search of its internal databases and information released by payers in the public domain in order to determine insurance coverage for the screening services described above. Publicly released sources include, but are not limited to: medical policies, payment policies, provider manuals, provider newsletters, coding documents, laboratory guidelines, SEC filings, and marketing collateral. In some instances, the search was supplemented with sources outside Policy Reporter’s database.

Results

Table 1 summarizes the insurance coverage landscape for 13 common screening tests among the 30 largest U.S. insurers, comprising Medicare, TRICARE, the Department of Veterans Affairs, and the next 27 largest insurers.

Following the USPSTF guidance as mandated by the ACA, several screening tests are currently covered by all the insurance plans included in this review. These include mammography, Pap testing (including Pap+HPV

Test	Breast		Cervix		Colorectal					Lung	Prostate		
	Mammography	Breast Tomosynthesis	Pap Test	Pap+HPV Test	FIT	FOBT	Stool DNA	Colonoscopy	Flexible Sigmoidoscopy	CT Colonography	Low-dose CT	Prostate Specific Antigen	Digital Rectal Exam
Summary	# Plans	30	30	30	30	30	30	30	30	30	30	30	30
	Covered	30	13	30	29	24	30	7	30	30	15	30	28
	Not Covered	0	17	0	0	0	0	16	0	0	10	0	0
	No Policy/Uncertain	0	0	0	1	6	0	7	0	0	5	0	2
	Medicare	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y
	Tricare	Y	N	Y	Y	Y	Y	NP	Y	Y	N	Y	Y
	Department of Veterans Affairs	Y	N	Y	Y	Y	Y	NP	Y	Y	N	Y	Y
Medicaid Plans	California Medicaid	Y	Y	Y	Y	Y	Y	NP	Y	Y	N	Y	NP
	New York Medicaid	Y	N	Y	Y	Y	Y	NP	Y	Y	N	Y	NP
	Texas Medicaid	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	NP
	Florida Medicaid	Y	N	Y	Y	Y	Y	NP	Y	Y	NP	Y	NP
	Illinois Medicaid	Y	Y	Y	Y	Y	Y	N	Y	Y	NP	Y	NP
	Ohio Medicaid	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NP
	Pennsylvania Medicaid	Y	Y	Y	Y	Y	Y	NP	Y	Y	NP	Y	NP
	Wellcare	Y	Y	Y	Y	NP	Y	N	Y	N	Y	Y	Y
Commercial Plans	United Healthcare	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
	Anthem	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Aetna	Y	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y
	Health Care Service Corporation	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	NP
	Humana	Y	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y
	Cigna	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	NP
	Kaiser	Y	N	Y	Y	NP	Y	NP	Y	Y	NP	Y	Y
	Highmark Pennsylvania	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y
	BCBS Federal Employee Plan	Y	Y	Y	Y	NP	Y	N	Y	Y	Y	Y	NP
	Blue Cross Blue Shield Michigan	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	NP
Blue Cross Blue Shield Florida	Y	N	Y	Y	NP	Y	N	Y	Y	N	Y	NP	
Blue Shield California	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	
Horizon New Jersey	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	NP	NP	

[Click to view Table 1](#)

Table 1. Summary of Insurance Coverage for Common Screening Tests

testing), low-dose CT for lung cancer screening, and several colorectal cancer screening tests (FOBT, colonoscopy, and flexible sigmoidoscopy).

Other tests—such as prostate specific antigen testing—are not USPSTF-mandated tests, but are covered by nearly all insurance plans.

Although FIT-DNA testing and virtual colonoscopy are covered in the revised 2016 USPSTF recommendations, some insurance plans do not cover these services. Other tests included in one or more of the guidelines—such as digital breast tomosynthesis—also are not covered by many insurance plans.

In some instances, the policy search was unable to identify specific language describing the coverage of certain screening exams, and therefore it was not possible to verify whether these plans provided coverage for some services. This was particularly common for digital rectal exams, where the search was unable to identify specific coverage language for more than half of the plans.

Implications for Health

Efficacious cancer screening reduces cancer mortality. While even the most refined screening tests will never be perfect tools for detecting malignancies, in certain instances—such as cervical and colon cancer screening—guidelines between organizations are fairly consistent. In other instances—such as screening for breast or prostate cancer—experts who have assessed the same evidence for risks and benefits have arrived at different conclusions.

Relatively few studies have focused on whether confusion about inconsistent screening guidelines affects physicians' advice or hinders patients' compliance with the guidelines. A 2010 study explored whether patients who had discussed colorectal screening options with their physicians were more confused when asked to consider multiple recommended tests, rather than one, and whether their confusion led to lack of compliance. The authors concluded that both occurred—with patients who reported being confused nearly twice as likely to forego screening.⁵² On the other hand, a 2009 study of colorectal cancer screening by a nationally representative sample of non-federal, office-based primary care physicians, general practitioners, general internists, and obstetrician/gynecologists found that although updated guidelines offer multiple screening options, 95% of physicians surveyed routinely recommended colonoscopy and relatively few discuss the full menu of test options.⁵³

It is clear that primary care physicians play a critical role in screening uptake, and adherence to cancer screening often hinges on effective physician-patient communication about screening. A 2009 study found that patients who perceived their physicians to be enthusiastic (at any level) in their discussions of mammography or stool-based

blood tests were significantly more likely to report a recent screening test than patients who reported no discussions with their doctors. “[I]t is not simply *whether* physicians communicate with patients about cancer screening that is important in promoting screening, but also *how* physicians communicate with patients,” the authors noted.⁹

Recent research underscores the importance of insurance coverage in cancer screening. A 2016 randomized controlled study of the impact of health insurance on cancer screening rates during the Oregon Medicaid lottery, found that those who were selected in the lottery to acquire Medicaid coverage had significantly higher rates of several common cancer screenings, including Pap tests and colonoscopies, compared to those who were not selected.⁵⁴ Similarly, a 2015 study found that in states with early Medicaid expansion, breast cancer screening increased in precisely the low-income population expected to benefit most from the ACA.⁵⁵ A 2016 study showed that Medicare-eligible individuals were significantly more likely to undergo all examined preventive services—for breast cancer, colorectal cancer, and prostate cancer—and that the effect was most pronounced among low-income individuals.⁵⁶

Guaranteed insurance coverage for recommended cancer screenings carries the promise of reducing health disparities. Uninsured women are about half as likely to have had a mammogram in the past year as the general population and are about 30% less likely to have had a Pap test in the past three years than insured women.⁵⁷ Studies show that the CDC's National Breast and Cervical Cancer Early Detection Program, which provides grants for support services (such as outreach, education, and help navigating the medical system) across the nation, has lowered breast cancer death rates, expanded women's treatment options, and moved up the timing of diagnosis and treatment of cervical cancer.⁵⁷

With cancer screening technologies being refined continually, it is vital that we address the twin issues of conflicting screening guidelines and variable insurance coverage for screening, and promptly correct lags or gaps in mandated coverage. When the hurdles to effective cancer screening are surmounted, it will represent an even more impressive public health milestone as the 21st century unfolds.

Acknowledgments

This work was sponsored by Hologic, Inc. The authors gratefully acknowledge the contributions of Scott Pohlman and Kathleen Troeger from Hologic and Carolyn R. Aldigé, Jan Bresch, Karen Peterson, PhD, and Bernard Levin, MD (Scientific Advisor) from the Prevent Cancer Foundation who reviewed and provided valuable comments, guidance, and direction in the development of this article.

References

1. Centers for Disease Control and Prevention (CDC). Ten Great Public Health Achievements—United States, 2001–2010. *MMWR Morb Mortal Wkly Rep.* 2011;60(19):619–623.
2. Centers for Disease Control and Prevention. Leading Causes of Death. April 27, 2016, Available at: <http://www.cdc.gov/nchs/fastats/leading-causes-of-death.htm>. Accessed August 18, 2016.
3. American Cancer Society. *Cancer Facts & Figures 2016*. Atlanta: American Cancer Society; 2016; 72 pp.
4. Morris E, Feig SA, Drexler M, Lehman C. Implications of overdiagnosis: impact on screening mammography practices. *Popul Health Manag.* 2015;18(suppl 1):S-3–S-11.
5. Byers T, Wender RC, Jemal A, et al. The American Cancer Society challenge goal to reduce US cancer mortality by 50% between 1990 and 2015: results and reflections. *CA Cancer J Clin.* 2016; doi: 10.3322/caac.21348.
6. National Cancer Institute. Tests to Detect Colorectal Cancer and Polyps. July 7, 2016. Available at: <http://www.cancer.gov/types/colorectal/screening-fact-sheet>. Accessed August 18, 2016
7. National Cancer Institute. Cervical Cancer Screening (PDQ®) – Patient Version. General Information about Cervical Cancer. April 14, 2016. Available at: http://www.ncbi.nlm.nih.gov/books/NBK65772/#CDR0000304518__7. Accessed August 18, 2016.
8. National Institutes of Health. Cervical Cancer. March 29, 2013. Available at: <https://report.nih.gov/nihfactsheets/viewfactsheet.aspx?csid=76>. Accessed August 18, 2016.

9. Fox SA, Heritage J, Stockdale SE, Asch SM, Duan N, Reise SP. Cancer screening adherence: does physician-patient communication matter? *Patient Educ Couns*. 2009;75:178-184.
10. RadiologyInfo.org For patients. Mammography. Radiological Society of North America. September 30, 2015. Available at: <http://www.radiologyinfo.org/en/info.cfm?pg=mammo>. Accessed August 18, 2016.
11. U.S. Food and Drug Administration. FDA approves first 3-D mammography imaging system. February 11, 2011. Available at: <http://www.fda.gov/NewsEvents/Newsroom/PressAnnouncements/ucm243072.htm>. Accessed August 28, 2016.
12. Friedewald SM, Rafferty EA, Rose SL, et al. Breast cancer screening using tomosynthesis in combination with digital mammography. *JAMA*. 2014;311:2499-2507.
13. Skaane P, Bandos AI, Gullien R, et al. Comparison of digital mammography alone and digital mammography plus tomosynthesis in a population-based screening program. *Radiology*. 2013;267:47-56.
14. Ciatto S, Houssami N, Bernardi D, et al. Integration of 3D digital mammography with tomosynthesis for population breast-cancer screening (STORM): a prospective comparison study. *Lancet Oncol*. 2013;14:583-589.
15. Conant EF, Beaber EF, Sprague BL, et al. Breast cancer screening using tomosynthesis in combination with digital mammography compared to digital mammography alone: a cohort study within the PROSPR consortium. *Breast Cancer Res Treat*. 2016;156:109-116.
16. Rafferty EA, Durand MA, Conant EF, et al. Breast cancer screening using tomosynthesis and digital mammography in dense and nondense breasts. *JAMA*. 2016;315:1784-1786.
17. Hardy K. Breast Tomosynthesis — Experts Discuss Their Current Use of the 3D Mammography Tool. *Radiology Today*. 2013;14:26. Available at: <http://www.radiologytoday.net/archive/rt0613p26.shtml>. Accessed August 28, 2016.
18. RadiologyInfo.org For patients. Breast Cancer Screening. Radiological Society of North America. April 7, 2016. Available at: <http://www.radiologyinfo.org/en/info.cfm?pg=mammo>. Accessed September 9, 2016.
19. National Cancer Institute. Breast Cancer Screening (PDQ®)—Patient Version. January 22, 2016. Available at: http://www.cancer.gov/types/breast/patient/breast-screening-pdq#section/_13. Accessed August 18, 2016.
20. Centers for Disease Control and Prevention. What Should I Know About Screening? March 29, 2016. Available at: http://www.cdc.gov/cancer/cervical/basic_info/screening.htm. Accessed August 18, 2016.
21. American Cancer Society. Colorectal Cancer Screening Tests. Last revised June 24, 2016. Available at: <http://www.cancer.org/cancer/colonandrectumcancer/moreinformation/colonandrectumcancerearlydetection/colorectal-cancer-early-detection-screening-tests-used>. Accessed August 28, 2016.

22. American Cancer Society. Lung Cancer Prevention and Early Detection. February 22, 2016. Available at: <http://www.cancer.org/acs/groups/cid/documents/webcontent/acspc-039558-pdf.pdf>. Accessed August 18, 2016.
23. Centers for Disease Control and Prevention. What Screening Tests Are There? March 14, 2016. Available at: http://www.cdc.gov/cancer/lung/basic_info/screening.htm. Accessed August 18, 2016.
24. National Cancer Institute. Prostate-Specific Antigen (PSA) Test. July 24, 2012. Available at: <http://www.cancer.gov/types/prostate/psa-fact-sheet>. Accessed August 18, 2016.
25. Bryant RJ, Sjoberg DD, Vickers AJ, et al. Predicting high-grade cancer at ten-core prostate biopsy using four kallikrein markers measured in blood in the ProtecT study. *J Natl Cancer Inst.* 2015;107(7). pii: djv095.
26. van Poppel H, Haese A, Graefen M, et al. The relationship between Prostate CAncer gene 3 (PCA3) and prostate cancer significance. *BJU Int.* 2012;109:360-366.
27. National Cancer Institute. Cancer Screening Overview (PDQ®) – Health Professional Version. June 30, 2016. Available at <http://www.cancer.gov/about-cancer/screening/hp-screening-overview-pdq>. Accessed August 18, 2016.
28. News-Medical.Net. Experts discuss recent controversies related to breast cancer screening recommendations. April 19, 2016. Available at: <http://www.news-medical.net/news/20160419/Experts-discuss-recent-controversies-related-to-breast-cancer-screening-recommendations.aspx> Accessed August 28, 2016.
29. Skerrett P. Experts debate: When should women start getting mammograms? Boston, MA: STAT. November 3, 2015. Available at: <https://www.statnews.com/2015/11/03/clashing-breast-cancer-screening-guidelines-confuse-women-health-care-providers/> Accessed August 28, 2016.
30. Caverly TJ, Hayward RA, Reamer E, et al. Presentation of benefits and harms in US cancer screening and prevention guidelines: systematic review. *J Natl Cancer Inst.* 2016;108:djv436.
31. Loeb S. Guideline of guidelines: prostate cancer screening. *BJU Int.* 2014;114:323-325.
32. U.S. Preventive Services Task Force. Prostate cancer: screening—final recommendation statement. October 2014. (Update in progress). Available at: <http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/prostate-cancer-screening>. Accessed August 15, 2016.
33. Nelson HD, Pappas M, Cantor A, Griffin J, Daeges M, Humphrey L. Harms of breast cancer screening: systematic review to update the 2009 U.S. Preventive Services Task Force recommendation. *Ann Intern Med.* 2016;164:256-267.
34. Fallon Health. 2016 HEDIS® measures. Updated December 2015. Available at: <http://www.fchp.org/providers/resources/hedis-measures.aspx> Accessed August 28, 2016.
35. U.S. Preventive Services Task Force. About the

- USPSTF. January 2016. Available at: <http://www.uspreventiveservicestaskforce.org/Page/Name/about-the-uspstf>. Accessed August 18, 2016.
36. U.S. Preventive Services Task Force. Grade Definitions. June 2016. Available at: <http://www.uspreventiveservicestaskforce.org/Page/Name/grade-definitions>. Accessed August 18, 2016.
37. Kaiser Family Foundation. Preventive Services Covered by Private Health Plans under the Affordable Care Act. August 4, 2015. Available at: <http://kff.org/health-reform/fact-sheet/preventive-services-covered-by-private-health-plans/> Accessed August 19, 2016.
38. U.S. Preventive Services Task Force. Breast cancer: screening—final recommendation statement. February 2016. Available at: <http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/breast-cancer-screening1>. Accessed August 15, 2016.
39. U.S. Preventive Services Task Force. Cervical cancer: screening—final recommendation statement. October 2014. (Update in progress) Available at: <http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/cervical-cancer-screening>. Accessed August 15, 2016.
40. U.S. Preventive Services Task Force. Colorectal cancer: screening—final recommendation statement. June 2016. Available at: <http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/colorectal-cancer-screening2>. Accessed August 15, 2016.
41. U.S. Preventive Services Task Force. Lung cancer: screening—final recommendation statement. October 2014. Available at: <http://www.uspreventiveservicestaskforce.org/Page/Document/RecommendationStatementFinal/lung-cancer-screening>. Accessed August 15, 2016.
42. National Comprehensive Cancer Network. About the NCCN Clinical Practice Guidelines in Oncology (NCCN Guidelines®). Available at: <https://www.nccn.org/professionals/default.aspx>. Accessed August 18, 2016.
43. National Comprehensive Cancer Network. Breast cancer screening and diagnosis. NCCN Clinical Practice Guidelines in Oncology, Version 1.2016—July 27, 2016; 68 pp.
44. Saslow D, Solomon D, Lawson HW, et al. American Cancer Society, American Society for Colposcopy and Cervical Pathology, and American Society for Clinical Pathology screening guidelines for the prevention and early detection of cervical cancer. *Am J Clin Pathol*. 2012; 137:516–542.
45. National Comprehensive Cancer Network. Colorectal cancer screening. NCCN Clinical Practice Guidelines in Oncology, Version 1.2016—June 23, 2016; 50 pp.
46. National Comprehensive Cancer Network. Lung cancer screening. NCCN Clinical Practice

- Guidelines in Oncology, Version 2.2016—April 18, 2016; 58 pp.
47. National Comprehensive Cancer Network. Prostate cancer early detection. NCCN Clinical Practice Guidelines in Oncology, Version 2.2016—April 28, 2016; 53 pp.
48. American Cancer Society. Cancer Screening Guidelines Overview and Processes. Available at: <http://www.cancer.org/healthy/informationforhealthcareprofessionals/acsguidelines/guidelinesoverview/index> Accessed August 20, 2016.
49. American Cancer Society. American Cancer Society guidelines for the early detection of cancer. Available at: <http://www.cancer.org/healthy/findcancerearly/cancerscreeningguidelines/american-cancer-society-guidelines-for-the-early-detection-of-cancer>. Accessed August 15, 2016.
50. Salzman B, Beldowski K, de la Paz A. Cancer screening in older patients. *Am Fam Physician*. 2016;93:659-667.
51. American Cancer Society. Medicare coverage for cancer prevention and early detection. Atlanta: American Cancer Society. What is Medicare? July 24, 2015. Available at: <http://www.cancer.org/healthy/findcancerearly/cancerscreeningguidelines/medicare-coverage-for-cancer-prevention-and-early-detection>. Accessed August 18, 2016.
52. Jones RM, Vernon SW, Woolf SH. Is discussion of colorectal cancer screening options associated with heightened patient confusion? *Cancer Epidemiol Biomarkers Prev*. 2010;19:2821-2825.
53. Klabunde CN, Lanier D, Nadel MR, McLeod C, Yuan G, Vernon SW. Colorectal cancer screening by primary care physicians: recommendations and practices, 2006-2007. *Am J Prev Med*. 2009;37:8-16.
54. Wright BJ, Conlin AK, Allen HL, et al. What does Medicaid expansion mean for cancer screening and prevention? Results from a randomized trial on the impacts of acquiring Medicaid coverage. *Cancer*. 2016;122:791–797.
55. Dehkordy SF, Carlos RC, Kobernik E, Dalton V, Hall K. Trends in breast cancer screening: impact of early Medicaid expansion. [Abstract]. RSNA 2015; Abstract HS-2A-02. Radiological Society of North America, 2015.
56. Meyer CP, Allard CB, Sammon JD, et al. The impact of Medicare eligibility on cancer screening behaviors. *Prev Med*. 2016;85:47–52.
57. Ku L, Bysshe T, Steinmetz E, Bruen B. Health Reform and the Implications for Cancer Screening. February 26, 2016. Available at: <http://www.acscan.org/content/wp-content/uploads/2016/02/Health-Reform-and-the-Implications-for-Cancer-Screening.pdf>. Accessed August 18, 2016.

Increasing Receipt of Women's Preventive Services

Haley Stolp, MPH,^{1,2} and Jared Fox, PhD, MPP³

Abstract

The receipt of clinical preventive services is important for health promotion and prevention of illness, death, and disability for women in the United States. Today, the Affordable Care Act makes a variety of evidence-based preventive services available with no out-of-pocket cost to women with certain health insurance plans. Nevertheless, available service receipt data suggest receipt of the services for all American adults remains suboptimal. This article seeks to raise awareness about the critical gaps in the delivery of preventive services to women and highlight opportunities for women, primary care providers, and public health professionals to increase receipt of clinical preventive services among women.

Introduction

The receipt of clinical preventive services can significantly improve health outcomes for women, and save tens of thousands of lives per year.¹ For example, it is estimated that 3,700 lives would be saved and 30,000 cases of pelvic inflammatory disease would be prevented each year if 90% of women received appropriate screenings for breast cancer and chlamydia.¹ With approximately half of women in the United States not receiving the life-saving and evidence-based preventive care they need, increasing rates of preventive care receipt remains a long-standing public health goal.^{2,3} Clinical preventive services are an important part of protecting, promoting, and maintaining the health and

SAVE YOUR CERVIX

Cervical cancer usually does not show symptoms until later stages. Pelvic exams and regular Pap tests (also called Pap smears) are key to early detection.

 prevent
cancer
FOUNDATION
www.PreventCancer.org

DOI: 10.1089/jwh.2015.5552

¹IHRC Inc., Atlanta, Georgia; ²Division for Heart Disease and Stroke Prevention, National Centers for Chronic Disease Prevention and Health Promotion, Atlanta, Georgia; and ³Office of the Associate Director for Policy, Centers for Disease Control and Prevention, Atlanta, Georgia.

well-being of women, while reducing the burden of disease, disability, and death.

One of the main hallmarks of the Affordable Care Act (ACA) is promoting and increasing access to receipt of clinical preventive services. In addition to creating the National Prevention Strategy and establishing the Prevention and Public Health Fund, the ACA has increased affordable access to health care—and preventive care in particular.

The ACA has significantly reduced the number of uninsured. By allowing young adults up to 26 years of age to stay on their parents' health insurance plan (§1001), over 3 million young adults gained insurance between September 2010 and December 2011.⁴ From the third quarter of 2013 to October 2014, enrollment in Medicaid increased by about 10 million Americans.⁵ Additionally, over 11.7 million people enrolled in coverage for 2015 through the new Health Insurance Marketplace, with tax credits for those with incomes between 100% and 400% of the federal poverty level and cost sharing subsidies for those with incomes between 100% and 250% of the federal poverty level.⁶ During the first operating year of the Health Insurance Marketplace, the percentage of women ages 18–64

years who were uninsured declined from 18.9% in 2013 to 13.4% in 2014.⁷ Subsequent enrollment for 2015 coverage is expected to further decrease the percentage of uninsured women.⁶

In addition to providing affordable insurance coverage to millions of women, the ACA (§1001, §4103–4107) has eliminated out-of-pocket costs for certain women's preventive care services in many health plans.⁸ This provision applies to dozens of services for women of all ages (Table 1), includes well-woman visits, and is available to beneficiaries of the Medicaid expansion, non-grandfathered private health plans (grandfathered plans are exempt from the new regulations), and certain Medicaid and Children Health Insurance Programs. Medicare coverage with no out-of-pocket costs is provided for certain services. The complete list of services available with no out-of-pocket costs for non-grandfathered private health plans includes those recommended with a grade of A or B by the United States Preventive Service Task Force (USPSTF), vaccinations recommended by the Advisory Committee on Immunization Practices (ACIP), and recommended services for women and children supported by the Health Resources and Services Administration (HRSA).⁹

TABLE 1. CLINICAL PREVENTIVE SERVICES RECOMMENDED FOR WOMEN AND GIRLS BY THE UNITED STATES PREVENTIVE SERVICE TASK FORCE, ADVISORY COMMITTEE ON IMMUNIZATION PRACTICES, OR SUPPORTED BY THE HEALTH RESOURCES AND SERVICES ADMINISTRATION

Screenings/tests	Vaccinations
Anemia	Diphtheria, tetanus, pertussis
Autism	Haemophilus influenzae type b
Bacteriuria infection	Hepatitis A
Blood pressure	Hepatitis B
Breast cancer	Herpes zoster
Cervical cancer	Human papillomavirus
Chlamydia infection	Inactivated poliovirus
Cholesterol	Influenza (flu)
Colorectal cancer	Measles, mumps, rubella
Congenital heart defect	Meningococcal
Depression	Pneumococcal
Developmental	Rotavirus
Diabetes	Varicella
Gestational diabetes	
Gonorrhea	Screenings with Counseling or Intervention
Hearing	Alcohol misuse
Hematocrit or hemoglobin	Intimate partner violence
Hemoglobinopathies or sickle cell	Obesity
Hepatitis B	Tobacco use
Hepatitis C	
HIV	Newborn Screenings
Human papillomavirus	Suite of 57 metabolic and hemoglobinopathy screenings for newborns
Hypothyroidism	
Lead	Other
Lung cancer	Aspirin use to prevent heart attack or stroke
Osteoporosis	Psychosocial/behavioral assessments
Phenylketonuria	Breast cancer: medications for risk reduction
Rh incompatibility	Dental caries prevention
Syphilis	Developmental surveillance
Tuberculin	Falls prevention
Vision	FDA-approved contraception
	Fluoride chemoprevention
	Folic Acid supplementation
	Gonorrhea Preventive Medication
	Height, weight, head, and BMI measurements
	Iron supplements to prevent anemia
	Oral health risk assessment
	Well-child visits
	Well-woman visits
Counseling	
BRCA-related cancers	
Breastfeeding	
Healthy diet	
Sexually transmitted infections	
Skin cancer	

Click to view Table 1

Table 1. Clinical Preventive Services Recommended for Women and Girls by the United States Preventive Service Task Force, Advisory Committee on Immunization Practices, or Supported by the Health Resources and Services Administration

To date, HRSA has endorsed a set of preventive services for women recommended by the Institute of Medicine, the Bright Futures guidelines for children from the American Academy of Pediatricians, and newborn screenings from the Discretionary Advisory Committee on Heritable Disorders in Newborns and Children.⁸

The specifics of how the coverage requirement applies to individual plans and the details of what conditions must be met for the service to be covered without out-of-pocket costs are complex and available in a different publication for reference (Table 2).⁸ Despite these complexities, the preventive service coverage requirement is broad in its implementation. Approximately 30 million women are estimated to be newly covered for expanded preventive services under the ACA.^{10,11}

This preventive service coverage requirement, paired with the expansion of coverage, increases the opportunity for women to receive the preventive care they need to help prevent the onset of disease and reduce the severity and duration of adverse conditions when they are detected early.

Baseline Rates of Service Receipt

Although robust national data for preventive services are not currently available, data from the Centers for Disease Control and Prevention (CDC) and other sources may be leveraged to provide periodic insight into the progress being made in the delivery of clinical preventive services to women.

CDC published two Morbidity and Mortality Weekly Report supplements providing detailed baseline data for receipt of key clinical preventive services among adults and children.^{2,12} The findings from these reports confirm suboptimal rates of receipt of recommended preventive care among children and adults prior to implementation of the ACA.

Baseline assessments suggest there is opportunity for increasing receipt of women’s preventive services that address risk factors for cardiovascular disease, the leading cause of death for women.¹³ The USPSTF recommends the use of aspirin, when appropriate, by women ages 55–79 years for the prevention of ischemic stroke.¹⁴ The prevalence of recommended aspirin use among this group of at-risk women was 21.7% in 2007–2008, the latest years for which these data are available.¹⁵ Tobacco use screening and cessation is another service strongly recommended by the USPSTF.¹⁶

Despite the strong evidence linking tobacco use to cardiovascular disease, cancer, and other ailments, 2009–2010 data showed that only 23.2% of women who used tobacco were provided cessation counseling or cessation medications.¹⁷ Improvement in receipt of these high-value services is vital to reducing the burden

TABLE 2. ACA PREVENTIVE SERVICES COVERAGE REQUIREMENT BY PAYER (§1001, §4103–4107)

Payer	USPSTF grade “A” and “B” recommendations	ACIP recommendations	Endorsed by HRSA (IOM Women’s Preventive Service Guidelines, Bright Futures, Newborn Screenings)
Non-grandfathered private health insurance plans*	Required to cover with no out-of-pocket costs	Required to cover with no out-of-pocket costs	Required to cover with no out-of-pocket costs
Medicaid expansion plans	Required to cover with no out-of-pocket costs	Required to cover with no out-of-pocket costs	Required to cover with no out-of-pocket costs
Traditional Medicaid plans	No requirement. State option. Incentive of 1% increase in federal medical assistance percentage (FMAP) if all USPSTF and ACIP recommendations covered with no out-of-pocket costs.	No requirement. State option. Incentive of 1% FMAP increase if all USPSTF and ACIP recommendations covered with no out-of-pocket costs.	No requirement; State option
Medicare	Required to cover with no out-of-pocket costs if preventive service is covered by Medicare	Required to cover with no out-of-pocket costs if preventive service is covered by Medicare	No requirement; Federal option

Source of data: Fox JB, Shaw FE. Clinical preventive services coverage and the Affordable Care Act. Am J Public Health 2015;105:e7-e10. *Grandfathered plans that were in existence on or before March 23, 2010, and have continually met certain requirements are not required to cover any preventive care. ACA, Affordable Care Act; ACIP, Advisory Committee on Immunization Practices; HRSA, Health Resources and Services Administration; IOM, Institute of Medicine; USPSTF, United States Preventive Service Task Force.

[Click to view Table 2](#)

Table 2. ACA Preventive Services Coverage Requirement by Payer (§1001, §4103–4107)

of cardiovascular disease, and other chronic conditions, among women.

Lessons from Prior Health Reform Efforts

Findings from health reform efforts predating the ACA suggest that it may take several years for researchers using population-level surveys to measure and publish significant improvements in the receipt of preventive services and that those changes will be most pronounced in the portion of people newly receiving health insurance coverage as a result of the reforms. For example, in

2007, a comprehensive health reform effort took effect in Massachusetts. Similar to the ACA, Massachusetts provided near-universal insurance coverage through shared individual, employer, and government responsibility. The uninsured rate among adults aged 19–64 years dropped from 13.4% (2006) to 5.8% (2010) following reform.¹⁸ For that same age group, there were also increases in recent preventive care visits (69.9% to 75.8%) during the same timeframe.¹⁸ Similarly, in 2008, Oregon used a lottery to expand enrollment in Medicaid to approximately 10,000 low-income adults. Getting Medicaid coverage increased the receipt of preventive care such as mammograms (by 100%), cervical cancer screening (by 30%), and cholesterol monitoring (by 50%) compared with those without Medicaid.¹⁹ The results from these studies suggest the next few years may show significant increases in receipt of preventive services among those gaining health insurance through the ACA's coverage expansions that took effect in 2014.

Early Data Following Partial ACA Implementation

Preliminary findings from studies that have measured the receipt of preventive services following the

implementation of the ACA in 2010, but before the full effect of the law can be measured, suggest the ACA has begun to improve the rate of preventive service receipt among women. A recent analysis by Lipton and Decker estimated that the ACA provisions that expanded coverage and provided no out-of-pocket cost coverage for preventive services increased likelihood of receiving and completing the human papillomavirus (HPV) vaccine by 7.7 and 5.8 percentage points, respectively, for women ages 19–25 relative to a control group of women age 18 or 26.²⁰ This rise in receipt of the HPV vaccine ensures fewer women will develop infections and some attributed to HPV infection.²¹

Assessing the impact of Medicaid expansion—as per the ACA—on receipt of preventive services, Sabik et al. ascertained that Medicaid expansion was associated with a higher receipt of preventive services among women. Specifically, they discovered that women in nonexpansion states had significantly lower odds of receiving recommended mammograms (odds ratio [OR] 0.87, 95% confidence interval [CI] 0.79–0.95) or Pap tests (OR 0.87, 95% CI 0.79–0.95).²² The trend of preventive service receipt will be further assessed as the implementation of the ACA progresses and data on

preventive service receipt becomes available.

Barriers and Opportunities to Receipt of Preventive Services

There are a number of individual and systematic factors that affect the receipt of recommended preventive care. Some of these factors include insufficient access to primary care providers, lack of patient education about services, limited time during patient appointments for the delivery of preventive services, and payment models that do not provide sufficient incentives to prioritize preventive care. Fortunately, there are opportunities to reduce or eliminate these barriers.

Access

Access to health care is critical for women to benefit from the preventive service coverage with no out-of-pocket cost provision in the ACA. Having sufficient access means consumers have the ability to afford health care services, access a health care location where needed services are provided in a timely manner, and find a health care provider with whom the patient can communicate and trust.²³ Gaining entry into the health care system in the United States generally begins with having health insurance. Accessing a health

care location to receive preventive services requires consumers to find a primary care provider who will accept them as a patient. And in order to benefit from coverage without out-of-pocket costs for preventive services, this provider must be within the patient's insurance network of providers. Successfully navigating all of these steps can be difficult given a shortage of primary care providers and family physicians who serve women.^{24,25} This may also be a challenge for women newly enrolled in a health insurance plan and not familiar with using health insurance to access primary care services. Assuming a consumer is able to secure a primary care provider and schedule a timely appointment, she must still make it to her appointment—a task that may be challenging for women who work, care for children, provide eldercare, or do a combination of these activities. Making scheduled appointments becomes more difficult if women encounter barriers to transportation, a factor that continues to adversely affect access to healthcare in the United States.²⁶ In the end, preventive service coverage alone is not sufficient for women to access preventive care.

Fortunately, there are a number of ACA provisions

that aim to improve patient access to primary care. Patients' access to preventive care is primarily expanding as more Americans gain entry into the health system by obtaining health insurance coverage through the Health Insurance Marketplace. To date, an estimated 16.4 million previously uninsured people have gained health insurance coverage since the implementation of the ACA coverage provisions.²⁷ As the number of insured Americans continues to rise, the ACA expands the capacity to provide primary care services by funding efforts to support the operation, expansion and construction of community health centers throughout the country over 5 years (§5313).²⁸ With the allocation of these funds, the number of patients served by community health centers on an annual basis has increased by nearly 6 million—from 17 million in 2009 to 23 million in 2014.²⁸ In turn, these clinics are supported by HRSA to receive recognition as patient centered medical homes (PCMHs), a designation reserved for clinics that achieve quality standards such as ensuring patient-centered access to care by expanding operating hours and offering alternative types of clinical encounters.^{29,30} In parallel, the ACA is expanding the primary care workforce by increasing investments in the National Health Service

Corps, a program that funds 9,200 Corps clinicians to serve in medically underserved communities, and increasing investments in primary care residency positions and programs.^{31,32} Collectively, these ACA provisions are perceived to be improving consumers' access to preventive care.^{7,33}

Education

The ACA's preventive service coverage requirement has been in effect for certain plans for up to five years for the USPSTF and ACIP services and for up to two years for the HRSA-endorsed women's preventive services. A poll conducted in March of 2014 found that fewer than half of Americans were aware that the ACA eliminates out-of-pocket costs for select preventive care.³⁴ Addressing this knowledge gap is critical to optimizing preventive care receipt, especially among women given the tendency for women to forgo care due to cost or perceived cost. A recent survey found that 20% of women aged 18–64 report that they postponed preventive services in the past year due to cost, including 13% of insured and 52% of uninsured women.³⁵ Knowing that some preventive care is available at no out-of-pocket cost may help mobilize consumers to seek

out these services. Increased efforts by health care and public health professionals to make more women and their providers aware of this special coverage could help increase uptake of preventive services.

The U.S. Department of Health and Human Services is making strides to increase the public's knowledge about preventive service coverage and other health insurance benefits. There are a number of resources and tools available to help consumers learn about their preventive service coverage benefit. The Centers for Medicare and Medicaid Services (CMS) leads an initiative called "Coverage to Care," a campaign to help people use their health care coverage to access primary care.³⁶

Consumers can access the Coverage to Care Roadmap online at www.hhs.gov/healthcare/prevention/index.html. Healthcare professionals can also download or order free Coverage to Care materials online at <http://marketplace.cms.gov/c2c>. CMS also houses the Center for Consumer Information and Insurance Oversight (CCIIO), a government resource center that provides information and technical support through the Consumer Assistance Program to help consumers understand their health insurance coverage and, if

appropriate, appeal coverage decisions.³⁷

Consumer education about the value of clinical preventive services can be a contributing factor to the receipt of services.³⁸ If women are aware of the health benefits that preventive services may offer, they may be more inclined to receive recommended care.³⁹ For example, data suggest that lack of knowledge is the main reason why parents of girls allow their child to go without receiving the ACIP-recommended vaccine that protects against HPV infection.^{21,40} If more unvaccinated young women were informed about the benefits of the HPV vaccine—and its potential for being covered with no out-of-pocket costs—HPV vaccination coverage might rise. Addressing knowledge deficits about recommended preventive care and the health benefits of these services is a key step to increase receipt of preventive care. Recently a wealth of consumer-facing information about recommended preventive services has been made publicly available online. One new consumer-facing tool is CDC's Prevention Checklist, an interactive tool, also available as a mobile application, that produces a list of recommended preventive services specific to the user based on sex, age and, if appropriate, pregnancy status.⁴¹ Each service in the list also has a link

to valid information about the preventive services for consumers. This tool is available online at www.cdc.gov/prevention/. Medicare also provides information about Part B preventive services coverage at www.medicare.gov/coverage/preventive-and-screening-services.html. Despite the public availability of this information, it remains critical for patients to speak with their providers about the preventive services that are recommended for them. This patient-provider dialogue is fundamental to the delivery of preventive services.⁴²⁻⁴⁴ Given their knowledge of their patients' medical history and family health history and their extensive knowledge about the risks and benefits associated with preventive services, primary care providers are uniquely situated to champion the delivery of recommended preventive services.

Delivery

Receipt of clinical preventive services may also face barriers from the supply side. One key factor is the limited amount of time a provider has to provide preventive services. Yarnall et al. estimated that it would take a primary care provider in a standard-sized practice 7.4 hours of every working day to implement all of the

USPSTF recommendations in every case that warranted a preventive service.⁴⁵ The authors also found that it would take 2 hours of every working day just providing the services recommended with an “A” grade by the USPSTF.⁴⁶ These time constraints may limit the degree to which primary care providers prioritize the delivery of preventive services during patient visits.

An emerging body of evidence suggests leveraging the workforce of other state-qualified nonlicensed providers, like community health workers, can be an effective way to improve uptake of appropriate preventive services and help alleviate the limitations that come with health care provider time constraints.⁴⁷⁻⁵¹ With appropriate training and supervision, community health workers may be used to provide services like one-on-one counseling services.⁵² These counseling services may address women's health issues such as breastfeeding, contraceptives, intimate partner violence, prevention of sexually transmitted infections and HIV, or diet and nutrition—all of which are services made available without out-of-pocket costs through the preventive services coverage requirement. Studies have also shown that community health worker interventions can increase preventive service receipt, particularly for immunizations, mammograms, cervical

cancer screenings, and blood pressure management services.^{47,48,53,54} Overall, implementing a policy that authorizes nonphysician team members, such as nurses, pharmacists, and community health workers, to support primary care providers in the education or provision of preventive services can be an effective approach to address provider time constraints and increase the provision of preventive services.^{55,56} States are beginning to explore financing options to sustain the workforce of non-licensed providers, allowing for more clinics to adopt team-based models of care.⁵⁷

The movement to improve the quality of care provided has also led to the development of new models of care that hold promise for increasing receipt of recommended services. For example, the National Committee for Quality Assurance Patient-Centered Medical Home Recognition program is the program that HRSA is using to certify HRSA-funded health centers as PCMHs across the nation. It has a “must-pass” standard that requires PCMH-recognized clinics to monitor receipt of preventive care services, chronic care measures, and/or immunization coverage for their patient population.³⁰ Studies suggest adoption of this PCMH model increases preventive service receipt.⁵⁸⁻⁶⁰ Emerging payment

models being explored by the CMS Center for Medicare and Medicaid Innovation are also expected to drive improvement in preventive service receipt.⁶¹ Meaningful use of certified electronic health record systems through the Medicare and Medicaid Electronic Health Record Incentive Programs, for example, includes components that require providers to use clinical decision support tools to provide evidence-based care and develop registries to identify patients who are not up-to-date on their recommended preventive care. The 2019 launch of the Merit-Based Incentive Payment System, a new quality reporting system that adjusts payments for services provided to Medicare beneficiaries based on providers' performance measures, is expected to accelerate and sustain this movement towards value-based payment.⁶² These types of systems are anticipated to improve receipt of appropriate clinical preventive services.

Conclusion

Baseline assessments indicate there is much room for improvement in the receipt of preventive services among women. The preventive services coverage requirement and other provisions in the ACA have

increased access to preventive care, optimizing the opportunity for women to receive recommended clinical preventive services. These new opportunities, driven by the ACA and new models of care, have the potential to overcome barriers in the receipt of preventive care. If these opportunities are fully realized and leveraged, the increasing use of preventive services could allow more American women to enjoy longer, healthier lives from the timely detection and response to preventable adverse health conditions.

Acknowledgments

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

Authors Disclosure Statement

No competing financial interests exist.

References

1. National Commission on Prevention Priorities. Preventive Care: A National Profile on Use, Disparities, and Health Benefits. Washington, DC: National Commission on Prevention Priorities, 2007.
2. Frieden TR; Centers for Disease Control and Prevention (CDC). Use of Selected Clinical Preventive Services Among Adults—United States, 2007–2010. *MMWR Morb Mortal Wkly Rep* 2012;**5**;61 Suppl:1–2.
3. Robertson R, Collins SR. Women at risk: Why increasing numbers of women are failing to get the health care they need and how the Affordable Care Act will help. Findings from the Commonwealth Fund Biennial Health Insurance Survey of 2010. *Issue Brief (Commonw Fund)* 2011;**3**:1–24.
4. Sommers BD. Number of young adults gaining insurance due to the Affordable Care Act now tops 3 million. Washington DC: U.S. Department of Health and Human Services (HHS), 2012.
5. Mann C. Medicaid and CHIP enrollment milestone achievement: Enrollment grows by approximately 9.7 million additional Americans. Washington DC: HHS, 2014, Available at: www.hhs.gov/healthcare/facts/blog/2014/12/medicaid-chip-enrollment-october.html Accessed April 8, 2015.
6. Office of the Assistant Secretary for Planning and Evaluation. Health Insurance marketplaces 2015 open enrollment period: March enrollment report. Washington, DC: HHS, Office of the Assistant Secretary for Planning and Evaluation (ASPE), 2015.
7. Sommers BD, Musco T, Finegold K, Gunja MZ, Burke A, McDowell AM: Health reform and changes in health insurance coverage in 2014. *New Engl J Med* 2014;**371**: 867–874.
8. Fox JB, Shaw FE. Clinical preventive services coverage and the Affordable Care Act. *Am J Public Health* 2015;**105**: e7–e10.
9. The Patient Protection and Affordable Care Act. Pub Law 111–148, March 2010.
10. Office of the Assistant Secretary for Planning and Evaluation. ASPE data point: The Affordable Care Act is improving access to preventive services for millions of Americans. Washington, DC: HHS, 2015.
11. Burke A, Simmons A. Increased coverage of preventive services with zero cost sharing under the Affordable Care Act. Washington, DC: HHS,

- 2014.
12. Frieden TR; Centers for Disease Control and Prevention. Use of selected clinical preventive services to improve the health of infants, children and adolescents—United States, 1999–2011. *MMWR Surveill Summ* 2014.
 13. National Center for Health Statistics. LCWK10: Deaths, percent of total deaths and rank order for 113 selected causes of death and Enterocolitis due to *Clostridium difficile*, by race and sex, United States, 2013–2014. Atlanta, GA: Centers for Disease Control and Prevention (CDC), 2014.
 14. U.S. Preventive Services Task Force. Aspirin for the prevention of cardiovascular disease: Recommendation statement. *Ann Intern Med* 2009;**150**:396–404.
 15. George MG, Tong X, Sonnenfeld N, Hong Y; CDC. Recommended use of aspirin and other antiplatelet medications among adults—National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey, United States, 2005–2008. *MMWR Morb Mortal Wkly Rep* 2012;61 Suppl:11–18.
 16. U.S. Preventive Services Task Force. Counseling and interventions to prevent tobacco use and tobacco-caused disease in adults and pregnant women: U.S. Preventive Services Task Force reaffirmation recommendation statement. *Ann Intern Med* 2009;**150**:551–555.
 17. Ritchey MD, Wall HK, Gillespie C, et al. Million hearts: Prevalence of leading cardiovascular disease risk factors— United States, 2005–2012. *MMWR Morb Mortal Wkly Rep* 2014;**63**:462–467.
 18. Long SK, Stockley K, Dahlen H. Massachusetts health reforms: Uninsurance remains low, self-reported health status improves as state prepares to tackle costs. *Health Affairs* 2012;**31**:444–451.
 19. Baicker K, Taubman SL, Allen HL, et al. The Oregon experiment—Effects of Medicaid on clinical outcomes. *N Engl J Med* 2013;**368**:1713–1722.
 20. Lipton BJ, Decker SL. ACA Provisions associated with increase in percentage of young adult women initiating and completing the HPV vaccine. *Health Affairs* 2015;**34**:757–764.
 21. Markowitz LE, Dunne EF, Saraiya M, et al.; Centers for Disease Control and Prevention. Human papillomavirus vaccination: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Recomm Rep* **2014**;2014:1–30.
 22. Sabik LM, Tarazi WW, Bradley CJ. State Medicaid expansion decisions and disparities in women's cancer screening. *Am J Prev Med* 2015;**48**:98–103.
 23. Bierman AS, Magari ES, Jette AM, Splaine M, Wasson JH. Assessing access as a first step toward improving the quality of care for very old adults. *J Ambul Care Manage* 1998;**21**: 17–26.
 24. Xierali IM, Puffer JC, Tong ST, Bazemore AW, Green LA. The percentage of family physicians attending to women's gender-specific health needs is declining. *J Am Board Fam Med* 2012;**25**:406–407.
 25. Bodenheimer T, Pham HH. Primary care: Current problems and proposed solutions. *Health Aff* 2010;**29**:799–805.
 26. Syed ST, Gerber BS, Sharp LK. Traveling towards disease: Transportation barriers to health care access. *J Community Health* 2013;**38**:976–993.
 27. Office of the Assistant Secretary for Planning and

- Evaluation. Health insurance coverage and the Affordable Care Act. Washington, DC: HHS, 2015.
28. Bureau of Primary Health Care, Health Resources & Services Administration: HRSA Health Center Program. 2015; [http:// bphc.hrsa.gov/about/healthcenterfactsheet.pdf](http://bphc.hrsa.gov/about/healthcenterfactsheet.pdf). Accessed October 2, 2015.
29. Health Resources and Services Administration. Patient centered medical home supplemental funding. U.S. HHS, 2015. Available at: <http://bphc.hrsa.gov/grants/pcmh.html>. Accessed March 18, 2015.
30. National Committee for Quality Assurance (NCQA). 2014 PCMH standards and guidelines. Washington, DC: NCQA, 2014.
31. U.S. Department of Health and Human Services. National Health Service Corps expands the primary care workforce in communities that need them most. Washington, DC: HHS, 2014.
32. U.S. Department of Health and Human Services. HHS awards \$83.4 million to train new primary care providers. Washington, DC: HHS, 2014.
33. Collins SR, Rasmussen PW, Doty MM. The rise in health care coverage and affordability since health reform took effect: Findings from the Commonwealth Fund Biennial Health Insurance Survey, 2014. *Issue Brief*. 2015;**2**:1–16.
34. Hamel L, Firth J, Brodie M. Kaiser Health tracking poll: March 2014. Menlo Park, CA: Henry J. Kaiser Family Foundation, 2014.
35. Kaiser Family Foundation. Preventive services covered by private health plans under the Affordable Care Act. Menlo Park, CA: Henry J. Kaiser Family Foundation, 2014.
36. Centers for Medicare and Medicaid. From coverage to care. June 2014. Available at: [https:// marketplace.cms.gov/technical-assistance-resources/c2c.html](https://marketplace.cms.gov/technical-assistance-resources/c2c.html) Accessed March 19, 2015.
37. Centers for Medicare and Medicaid. The Center for Consumer Information and Insurance Oversight: Consumer support and information. Available at: www.cms.gov/CCIIO/Programs-and-Initiatives/Consumer-Support-and-Information/index.html Accessed March 19, 2015.
38. Kamerow D. Designing a high-quality package of preventive services. Partnership for Prevention, 2008.
39. Moreno-Peral P, Conejo-Ceron S, Fernandez A, et al. Primary care patients' perspectives of barriers and enablers of primary prevention and health promotion—a meta-ethnographic synthesis. *PloS One*. 2015;**10**:e0125004.
40. Centers for Disease Control and Prevention. Human papillomavirus vaccination coverage among adolescents, 2007–2013, and postlicensure vaccine safety monitoring, 2006–2014—United States. *MMWR Morb Mortal Wkly Rep* 2014;**62**:620–624.
41. Centers for Disease Control and Prevention. CDC prevention checklist. 2014. Available at: www.cdc.gov/prevention Accessed March 19, 2015.
42. Why regular check-ups are still a good idea. An annual “well woman” visit has important health benefits—especially the doctor-patient relationship it fosters. *Harv Womens Health Watch* 2007;**14**:1–3.
43. Committee on Gynecologic Practice. Committee

- opinion No. 534: Well-woman visit. *Obstet Gynecol* 2012;**120**:421–424.
44. Rahman M, Elam LB, Balat MI, Berenson AB. Well-woman visit of mothers and human papillomavirus vaccine intent and uptake among their 9–17 year old children. *Vaccine* 2013;**31**:5544–5548.
45. Yarnall KS, Pollak KI, Ostbye T, Krause KM, Michener JL. Primary care: Is there enough time for prevention? *Am J Public Health* 2003;**93**:635–641.
46. Yarnall KS, Ostbye T, Krause KM, Pollak KI, Gradison M, Michener JL. Family physicians as team leaders: “Time” to share the care. *Prev Chronic Dis* 2009;**6**:A59.
47. Community Preventive Services Task Force. Cardiovascular disease prevention and control: Interventions engaging community health workers. Guide to Community Preventive Services, 2015. Available at: www.thecommunityguide.org/cvd/CHW.html Accessed April 13, 2015.
48. Fernandez ME, Gonzales A, Tortolero-Luna G, et al. Effectiveness of Cultivando la Salud: A breast and cervical cancer screening promotion program for low-income Hispanic women. *Am J Public Health* 2009;**99**:936–943.
49. Heisler M, Spencer M, Forman J, et al. Participants’ assessments of the effects of a community health worker intervention on their diabetes self-management and interactions with healthcare providers. *Am J Prev Med* 2009;**37**:S270–279.
50. Verhagen I, Steunenberg B, de Wit NJ, Ros WJ. Community health worker interventions to improve access to health care services for older adults from ethnic minorities: A systematic review. *BMC Health Serv Res* 2014;**14**:497.
51. Viswanathan M, Kraschnewski JL, Nishikawa B, et al. Outcomes and costs of community health worker interventions: A systematic review. *Medical Care* 2010;**48**:792–808.
52. Viswanathan M, Kraschnewski J, Nishikawa B, et al. Outcomes of community health worker interventions. *Evidence report/technology assessment*. 2009:1–144, A141–142, B141–114, pasim.
53. Brownstein JN, Chowdhury FM, Norris SL, et al. Effectiveness of community health workers in the care of people with hypertension. *A J Prev Med* 2007;**32**:435–447.
54. Lewin S, Munabi-Babigumira S, Glenton C, et al. Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases. *Cochrane Database Syst Rev* 2010:CD004015.
55. Centers for Disease Control and Prevention. Policy evidence assessment report: Community health worker policy components. Atlanta, GA: HHS, CDC, 2014.
56. Proia KK, Thota AB, Njie GJ, et al. Team-based care and improved blood pressure control: A community guide systematic review. *Am J Prev Med* 2014;**47**:86–99.
57. Statereforum. State community health worker models. 2015. Available at: www.statereforum.org/state-community-health-worker-models Accessed April 15, 2015.
58. Ferrante JM, Balasubramanian BA, Hudson SV, Crabtree BF. Principles of the patient-centered medical home and preventive services delivery. *Ann Fam Med* 2010;**8**:108–116.

59. Markovitz AR, Alexander JA, Lantz PM, Paustian ML. Patient-centered medical home implementation and use of preventive services: The role of practice socioeconomic context. *JAMA Intern Med* 2015;**175**:598–606.
60. Williams JW, Jackson GL, Powers BJ, et al.. Closing the quality gap: Revisiting the state of the science (vol. 2: The patient-centered medical home). *Evid Rep/ Technol Assess* 2012:1–210.
61. Kassler WJ, Tomoyasu N, Conway PH. Beyond a traditional payer–CMS's role in improving population health. *N Engl J Med* 2015;**372**:109–111
62. Doherty RB. Goodbye, sustainable growth rate—hello, merit-based incentive payment system. *Ann Intern Med* 2015;**163**:138–139.

Address correspondence to:

Haley Stolp, MPH
Division for Heart Disease and Stroke Prevention
National Center for Chronic Disease Prevention and Health Promotion
Centers for Disease Control and Prevention
4770 Buford Highway Northeast, MS F72
Atlanta, GA 30341
E-mail: Vul4@cdc.gov

This article has been cited by:

1. Vicki Flenady, Aleena M Wojcieszek, Philippa Middleton, David Ellwood, Jan Jaap Erwich, Michael Coory, T Yee Khong, Robert M Silver, Gordon C S Smith, Frances M Boyle, Joy E Lawn, Hannah Blencowe, Susannah Hopkins Leisher, Mechthild M Gross, Dell Horey, Lynn Farrales, Frank Bloomfield, Lesley McCowan, Stephanie J Brown, K S Joseph, Jennifer Zeitlin, Hanna E Reinebrant, Claudia Ravaldi, Alfredo Vannacci, Jillian Cassidy, Paul Cassidy, Cindy Farquhar, Euan Wallace, Dimitrios Siassakos, Alexander E P Heazell, Claire Storey, Lynn Sadler, Scott Petersen, J Frederik Frøen, Robert L Goldenberg. 2016. Stillbirths: recall to action in high-income countries. *The Lancet* **387**:10019, 691-702. [CrossRef]

Understanding Perceived Benefit of Early Cancer Detection: Community-Partnered Research with African American Women in South Los Angeles

Mohsen Bazargan, PhD,^{1,3} Anna Lucas-Wright, MA,^{1,2} Loretta Jones, MA,^{1,2} Roberto Vargas, PhD,³ Jaydutt V. Vadgama, PhD,¹ Shirley Evers-Manly, PhD, MSN, RN,¹ and Annette E. Maxwell, DrPH⁴

Abstract

Background: African American women have lower 5-year cancer survival rates than non-Latino White women. Differences in perceived benefits of early cancer detection among racial/ethnic groups may affect cancerscreening behaviors. This study assessed correlates of perceived benefits of early breast, cervical and colorectal cancer detection among 513 African American women.

Methods: Using a community-partnered participatory research approach, we conducted a survey on cancer screening, risk behaviors, and related knowledge and attitudes among African American parishioners at 11 churches in South Los Angeles, a neighborhood that experiences one of the highest cancer mortality rates in California.

Results: African American women who participated in this study were more likely to believe that chances for survival are very good or good after early detection of breast cancer (74%) than after early detection of colorectal (51%) and cervical cancer (52%). Multivariate analyses show that perceived benefit of early cancer detection is associated with higher cancer knowledge and having discussed one's cancer risk with a doctor.

Conclusions: Given that 5-year survival rates for early stage breast, cervical, and colorectal cancer range from 84% to 93%, our data suggest that a substantial proportion of African American women in South Los Angeles are not aware of the benefits of early detection, particularly of colorectal and cervical cancers. Programs that increase cancer knowledge and encourage a discussion of individual's cancer risk with a doctor may be able to increase perceived benefit of early detection, a construct that has been shown to be associated with cancer screening in some studies.

SAVE YOUR COLON

Colonoscopies and certain other approved screening tests can detect pre-cancerous polyps so you can have them removed before they develop into cancer.

 prevent
cancer
FOUNDATION
www.PreventCancer.org

DOI: 10.1089/jwh.2014.5049

¹Charles R. Drew University of Medicine and Science, Los Angeles, California. ²Healthy African American Families, Los Angeles, California. ³David Geffen School of Medicine, University of California Los Angeles, Los Angeles, California. ⁴Fielding School of Public Health and Jonsson Comprehensive Cancer Center, University of California Los Angeles, Los Angeles, California.

Introduction

Screening tests such as mammograms, Pap smears, and colonoscopies can detect cancer early and increase survival rates.¹ Based on a vast body of research, screening guidelines have been developed for the early detection of breast, cervical, and colorectal cancer.² Not all women are aware of these screening guidelines.^{3,4} However, a woman's belief regarding the benefits of screening is a construct that is included in many health behavior theories, including the Health Belief Model, Social Cognitive Theory, and the Health Behavior Framework.⁵⁻⁷ This construct, also labeled "perceived efficacy of early detection" or "perceived benefits of screening," has been discussed in the literature and particularly in studies with minority women in connection with fatalism.^{8,9} Women who perceive a cancer diagnosis as a "death sentence" typically do not believe that screening and early detection will improve survival after a cancer diagnosis.^{10,11}

A woman's belief in the benefit of screening may be influenced by her social network, her health care providers, and the media.^{12,13} Women who have a regular health care provider and who undergo routine

checkups may discuss the benefit of early detection with their providers, who usually recommend screening. Media can have a positive influence by reporting women's success stories in which cancers are detected early and successfully treated or a negative influence by reporting conflicting recommendations regarding screening guidelines or by casting doubt about the value of screening.^{13,14} Perceived benefits of screening may also be influenced by a woman's level of education and income, access to health care, and by cancer statistics that a woman observes in her social network and community.⁹

Researchers are interested in assessing perceived benefit of early cancer detection because this belief is postulated to influence the utilization of cancer screening tests, and it can potentially be modified through intervention. Stewart and colleagues found that perceived benefit of screening assessed at baseline was significantly associated with receipt of a mammogram at 3-year follow-up in a large and ethnically diverse sample of women and in the subgroup of African American women that were studied.¹⁵ However, other studies did not show an association of perceived benefit of early cancer detection and cancer screening behavior.¹⁶

Our research team, comprised of academic and community faculty, conducted community-partnered research that included a survey of African American women in 11 churches in South Los Angeles. South Los Angeles, a series of contiguous communities with a shared history, has a large proportion of African American residents (28% compared with 8% in Los Angeles County) that are disadvantaged with respect to income (31% have a household income less than 100% of federal poverty level, compared with 18% in Los Angeles County) and education (39% of adults have less than a high school education compared with 23% of adults in Los Angeles County), access to health care (38% uninsured nonelderly adults, 18–64 years old versus 28% in Los Angeles County).¹⁷ This area has one of the highest mortality rates, including for lung cancer (39.9 per 100,000 population compared with 31.3 in Los Angeles County), breast cancer (28.5 per 100,000 population compared with 21.3 in Los Angeles County), and colorectal cancer (19.8 per 100,000 population compared with 14.3 in Los Angeles County).¹⁷

Compared with non-Latino white women, African American women experience a greater mortality of breast, cervical, and colorectal cancer, later stage of diagnosis,

and lower 5-year survival rates (see Table 1).¹⁸ The purpose of this analysis is to gain a better understanding of the importance of this construct for participating in breast, cervical, and colorectal cancer screening among underserved African American women in South Los Angeles to inform future intervention development for this community.

Methods

This cross-sectional study used a community-partnered participatory research approach to develop the study aims and survey. Details of the study design have been described previously.¹⁹ In brief, this study was planned by a team of academic and community investigators. Utilizing a community-partnered participatory approach pioneered by L. Jones and colleagues,²⁰ a survey instrument was developed. The survey was conducted at 11 predominantly African American churches, including African Methodist Episcopal, Baptist, Seventh Day Adventist, and nondenominational churches. Community investigators participated in the analysis and interpretation of the data and the preparation of this manuscript. The overarching goal of this study was to gather data from the African American

faith community in South Los Angeles about cancer awareness and behaviors associated with prevention and screening for early detection. This study was approved by the Institutional Review Board of Charles R. Drew University of Medicine and Science.

Measures

Perceived benefit of early cancer detection was assessed by asking participants three questions: “If breast/cervical/colorectal cancer is detected early, what do you think is a person’s chance for survival? Would you say that her chance is: very good, good, fair, or poor?”

Cancer knowledge was measured using 25 true/false items that also had a “don’t know” response option. Items were selected from Webpages of UCLA’s Jonsson Comprehensive Cancer Center (Cancer Fact Sheet),²¹ Women’s Health (Women and Cancer),²² the American Cancer Society (Learn about Cancer),²⁰ and the Cancer Fact Sheet.²³ True/false items related to knowledge about general cancer and specific questions about breast, cervical, and colorectal cancer included the following questions:

- Human papilloma virus (HPV), a virus that can cause cancer, is contagious;

	Lifetime probability (%) of developing or dying from cancer, 2007–2009			
	Developing		Dying	
	African American	White	African American	White
All sites	33.7 (1 in 3)	38.9 (1 in 3)	19.2 (1 in 5)	19.6 (1 in 5)
Breast	10.9 (1 in 9)	12.7 (1 in 8)	3.2 (1 in 31)	2.7 (1 in 37)
Colorectum	5.0 (1 in 20)	4.7 (1 in 21)	2.3 (1 in 44)	1.9 (1 in 53)
Uterine cervix	0.8 (1 in 119)	0.6 (1 in 153)	0.4 (1 in 250)	0.2 (1 in 479)
	Five-year relative survival rates (%), U.S., 2002–2008		Percent diagnosed localized	
	African American	White	African American	White
	Breast			
All stages	78	90	51	61
Localized	93	99		
Colorectum ^a			36	40
All stages	57	65		
Localized	86	90		
Uterine cervix			40	49
All stages	59	69		
Localized	84	92		

^aMale and female.

[Click to view Table 1](#)

Table 1. Cancer Statistics for African American and Non-Latino White Women

- There are no symptoms of cervical cancer in the early stages;
- In its early stages, cervical cancer causes no pain or other symptoms;
- A diet high in animal fat increases the risk for several types of cancer;
- Regular exercise reduces risk for many types of cancer;
- Some polyps (bump on the surface of the colon) may become cancer;
- Having an inflammatory bowel disease for a long time increases a person’s risk of developing colorectal cancer;

- Certain types of cancer are genetic; and
- Ethnicity is a factor in the development of certain type of cancer.

A knowledge score was created by adding the number of correct responses. Since all other variables were categorical and for ease of interpretation, cancer-related knowledge was categorized into tertiles: (1) low, (2) medium, and (3) high.

Perceived health status was assessed using a single item: “In general, would you say that your health is excellent, very good, good, fair, or poor?”

Perceived risk of developing cancer was measured by asking participants “Compared to the average woman your age, how would you rate your own risk of getting cancer? Would you say that your risk is: same, higher, or lower?”

Participants were also asked if they had a regular or primary care doctor (access to care), if they had ever discussed their personal risk for any type of cancer with their doctor, and demographic data including gender, age, education, and marital status.

Sample and recruitment

The data for this study was collected during late winter 2012 and early spring 2013. Over a 4 months period

in 2012, the Community Principal Investigator (Co-PI) conducted community-engagement tasks with 13 churches in South Los Angeles, successfully garnering participation of 11 predominantly African American churches, including African Methodist Episcopal, Baptist, Seventh Day Adventist, and nondenominational churches. Church membership ranged from 50 to over 700 individuals. On the day of data collection, the PI and one of the Co-PI’s described the study and informed consent process to potential respondents at a designated time during the church service. A total of 801 participants (11 –149 participants per church) completed the study questionnaire in English, which took between 30 and 45 minutes. Assistance with reading the questionnaire was provided to 45 respondents who requested help. Upon completion of the survey, participants received \$10 cash. Of 827 individuals who were approached, 801 (97%) decided to participate in the study; only 26 individuals refused.¹⁸ This analysis included only African American women (n=513) who completed the survey. Therefore, 256 men and 32 women who did not self-identify themselves as African American were excluded from data analysis.

Statistical analysis

Statistical analysis was performed with the SPSS® program (SPSS 20.0 for Windows, SPSS Inc., Chicago, IL). Bivariate chi square tests were conducted to determine relationships between the outcome measure, perceived benefit of early detection of cancer, and other independent variables. In addition, a series of multivariate logistic regressions were performed predicting two levels of the outcome variable (very good and good versus fair and poor). A p -value <0.01 was considered statistically significant to account for multiple comparisons. To test for multicollinearity, intercorrelations among independent variables were examined. Additionally, data was examined for clustering effects and the intracluster correlation are shown to be relatively small; therefore, data was analyzed in a standard way.

Results

Characteristics of sample

Age of participants ranged from 18 to 94 years. Sixty-five percent of participants were 50 years of age or older and 14% had no regular or primary care

physician. Eighteen percent of participants reported fair or poor health.

Sixty-nine individuals (9.0%) reported that they have been diagnosed with a cancer, including 25 with breast cancer, 17 with cervical cancer, and 3 with colorectal cancer. Although 355 (69%) of respondents reported that one of their family members (blood relatives) had been diagnosed with some type of cancer, 48% of respondents had never discussed their personal risk of cancer with a doctor, including 44% of respondents aged 50 and older. Sixteen percent of the African American women who participated in this study indicated that compared with the average woman their age, they have a higher risk of developing cancer. In addition, 46% indicated that their risk is the same as others, whereas 38% perceived a lower risk than their counterparts (see Table 2).

Perceived benefit of early cancer detection

African American women who participated in this study reported a more positive perception about early detection of breast cancer than colorectal and cervical cancers. More than 74%, 51%, and 52% of participants indicated that if breast, colorectal, and cervical cancers

are “detected early” a person’s chances of survival are very good or good, respectively.

Cancer knowledge

The cancer knowledge score from the 25-item scale ranged from 2 to 24, with a mean of 14 and a median of 15. The proportion of “don’t know” responses ranged from 12% to 61% for individual items. Respondents demonstrated highest knowledge (>70% correct) for some of the more general items such as “certain types of cancer are genetic” or “a diet rich in fruits and vegetables greatly reduces risk of developing cancer.” Respondents had the lowest proportion of correct responses (<40% correct) and the largest proportion of don’t know responses (30%–60%) for some of the items on specific cancers such as “those who smoked for many years are at increased risk of developing colon cancer” and “human papilloma virus (HPV), a virus that can cause cancer, is contagious.”

Bivariate relationship

At the bivariate level (chi-square test), several variables including (1) education, (2) cancer knowledge, (3) perceived health status, (4) family history of cancer, and (5) discussion of cancer risk with a physician all

TABLE 2. CHARACTERISTICS OF STUDY SAMPLE AND BIVARIATE RELATIONSHIPS BETWEEN PERCEIVED BENEFITS OF EARLY DETECTION OF BREAST, COLORECTAL AND CERVICAL CANCERS AND SELECTED VARIABLES AMONG AFRICAN AMERICAN WOMEN (N=513)

Independent Variables	Total N (%)	Perceived chance of survival if cancers are detected early					
		Breast		Colorectal		Cervix	
		Very good or good N=361 (74%) n (%)	Fair or poor N=124 (26%) n (%)	Very good or good N=252 (51%) n (%)	Fair or poor N=238 (49%) n (%)	Very good or good N=246 (52%) n (%)	Fair or poor N=226 (48%) n (%)
Age							
< 50 years	179 (35)	129 (75)	43 (25)	91 (53)	81 (47)	96 (47)	73 (43)
≥ 50 years	334 (65)	232 (74)	81 (26)	161 (51)	157 (49)	150 (49)	153 (51)
Education							
No college degree	249 (50)	156 (68)	75 (33)	113 (48)	121 (52)	109 (47)	121 (53)
College degree	248 (50)	199 (83)	42 (17)	136 (56)	106 (44)	134 (59)	94 (41)
Marital status							
Single	367 (72)	249 (72)	96 (28)	175 (50)	172 (50)	174 (52)	161 (48)
Married	146 (28)	112 (80)	28 (20)	77 (54)	66 (46)	72 (53)	65 (47)
Cancer knowledge							
High	170 (33)	145 (88)	20 (20)	113 (68)	53 (32)	103 (66)	54 (34)
Medium	197 (38)	146 (76)	46 (24)	96 (50)	97 (50)	97 (51)	93 (49)
Low	146 (29)	70 (55)	58 (45)	43 (33)	88 (67)	46 (37)	79 (63)
Perceived health status							
Fair/poor	92 (18)	45 (55)	37 (45)	33 (40)	50 (60)	33 (40)	49 (60)
Good	234 (46)	174 (77)	51 (23)	125 (55)	101 (45)	119 (55)	97 (45)
Excellent/very good	186 (36)	141 (80)	36 (20)	93 (52)	87 (48)	93 (54)	80 (46)
Family member with cancer							
Yes	355 (69)	263 (77)	78 (23)	188 (54)	157 (46)	175 (53)	154 (47)
No	158 (31)	98 (68)	46 (32)	64 (44)	81 (56)	71 (50)	72 (50)
Have a regular Doctor							
Yes	439 (86)	317 (76)	102 (24)	223 (53)	201 (47)	217 (53)	191 (47)
No	74 (14)	44 (67)	22 (33)	29 (44)	37 (56)	29 (45)	35 (55)
Perceived cancer risk a same as others	236 (46)	168 (76)	52 (24)	128 (58)	94 (42)	118 (55)	97 (45)
Higher than others	84 (16)	61 (74)	22 (27)	36 (43)	47 (57)	41 (53)	37 (47)
Lower than others	193 (38)	132 (73)	50 (27)	88 (48)	97 (52)	87 (49)	92 (51)
Discussed risk of cancer with doctor							
Yes	267 (52)	212 (82)	46 (18)	148 (57)	114 (43)	137 (55)	111 (45)
No	246 (48)	149 (66)	78 (34)	104 (46)	124 (54)	109 (49)	115 (51)

Bolded values are significantly different, $p < 0.01$.

[Click to view Table 2](#)

Table 2. Characteristics of Study Sample and Bivariate Relationships Between Perceived Benefits of Early Detection of Breast, Colorectal and Cervical Cancers and Selected Variables Among African American Women (N=513)

showed a significant association with perceived benefit of early detection of breast, cervical, and colorectal cancer (see Table 2).

Multivariate evaluation

Multivariate logistic regression shows that only four independent variables are significantly associated with perceived chance of survival if cancer is detected early. Higher level of cancer knowledge, having a discussion of cancer risk with a physician, and a higher level of perceived health status are most consistently associated with high perceived chance of survival (see Table 3).

Controlling for all other independent variables, participants who reported that “if a person’s breast cancer is detected early, she has a very good/good chance to survive” (versus poor/fair) were 4.09 (95% confidence interval [CI] 2.20–7.62) times more likely to have a high level of cancer-related knowledge and 2.3 (CI 1.25–3.08) times more likely to have discussed their risk of cancer with a doctor. Participants who reported that “if a person’s colorectal cancer is detected early she has a very good/good chance to survive” (versus poor/fair) were 3.72 (CI 2.18 – 6.33) times more likely to have a high level of cancer-related knowledge and 1.97 (CI 1.25 – 3.08) times more likely to have discussed their risk of cancer with a doctor. High level of cancer knowledge was the only variable that was multivariately

related to high perceived benefit of early detection of cervical cancer.

Discussion

Higher perceived benefits of early detection of breast cancer as compared with colorectal and cervical cancer reported by African American women in our sample are consistent with cancer statistics in this population: African Americans experience higher survival rates after breast cancer compared with colorectal and cervical cancer. While only a few of our respondents may be familiar with specific cancer statistics on survival for African American women in South Los Angeles believe that there are differences in survival rates for breast, cervical, and colorectal cancer. Since beliefs and perceptions are often shaped by events in individuals’ environment,²⁴ this awareness may be influenced by cancer outcomes that women observe in their community.

However, given that 5-year survival rates range from 84% to 93% for all three cancers if detected early, our data suggest that a substantial proportion of African American women in South Los Angeles are not aware of

TABLE 3. MULTIVARIATE LOGISTIC REGRESSION MODELS BETWEEN INDEPENDENT VARIABLES AND PERCEIVED CHANCE OF SURVIVAL IF CANCER IS DETECTED EARLY AMONG AFRICAN AMERICAN WOMEN (N=513)

Independent variables	Perceived chance of survival if cancer is detected early					
	very good or good versus fair or poor					
	Breast		Colorectal		Cervix	
	OR	95% CI	OR	95% CI	OR	95% CI
Age						
<50 years	0.78	0.47–1.30	0.78	0.51–1.20	0.73	0.48–1.11
≥50 years	1.00	—	1.00	—	1.00	—
Education						
No college degree	1.40	0.86–2.29	0.99	0.65–1.50	1.27	0.84–1.91
College degree	1.00	—	1.00	—	1.00	—
Marital status						
Single	1.43	0.82–2.50	1.09	0.70–1.70	0.99	0.64–1.53
Married	1.00	—	1.00	—	1.00	—
Cancer knowledge						
High	4.09	2.20–7.62	3.72	2.18–6.33	2.47	1.46–4.18
Medium	2.43	1.38–4.28	1.56	0.94–2.59	1.62	0.98–2.69
Low	1.00	—	1.00	—	1.00	—
Perceived health status						
Fair/poor	0.48	0.24–0.95	0.83	0.39–1.47	0.69	0.38–1.28
Good	0.77	0.44–1.35	1.07	0.66–1.65	1.03	0.66–1.60
Excellent/very good	1.00	—	1.00	—	1.00	—
Family member with cancer						
Yes	1.30	0.78–2.17	1.35	0.87–2.11	0.90	0.58–1.39
No	1.00	—	1.00	—	1.00	—
Have a regular doctor						
Yes	1.21	0.63–2.33	0.99	0.55–1.79	0.98	0.54–1.76
No	1.00	—	1.00	—	1.00	—
Perceived cancer risk						
Same as others	1.45	0.85–2.48	1.97	1.25–3.08	1.58	1.02–2.47
Higher than others	0.83	0.41–1.70	0.68	0.37–1.24	1.15	0.63–2.11
Lower than others	1.00	—	1.00	—	1.00	—
Discussed risk of cancer with doctor						
Yes	2.31	1.40–3.80	1.68	1.11–2.55	1.31	0.87–1.98
No	1.00	—	1.00	—	1.00	—

For breast cancer: -2 log likelihood=434; chi-squared=64.4; Nagelkerke R-square=0.200.
 For colorectal cancer: -2 log likelihood=567; chi-squared=54.4; Nagelkerke R-square=0.152.
 For cervical cancer: -2 log likelihood=571; chi-squared=28.2; Nagelkerke R-square=0.084.
 Odds ratios that are bolded are significantly different from the reference group, p<0.01.
 CI, confidence interval; OR, odds ratio.

[Click to view Table 3](#)

Table 3. Multivariate Logistic Regression Models between Independent Variables and Perceived Chance of Survival if Cancer is Detected Early Among African American Women (N=513)

the benefits of early detection, particularly for colorectal and cervical cancers. For these two types of cancers, almost one out of two African American women in our study believed that chances of survival are fair or poor,

even if the cancer was detected early. Our findings confirm results from previous studies that have identified fatalistic attitudes towards cancer outcomes among African American women and the attitude that cancer is a death sentence.⁸⁻¹¹ For example, Hall and colleagues (2008) conducted a study with an ethnically diverse sample of women and found that women who believed that breast cancer could not be cured if found early were more likely to be African American.⁹ Programs designed to promote early detection of cancer among underserved African American women must seek to overcome these negative attitudes toward early detection of cancer.

This study shows that two variables are consistently associated with perceived benefit of early detection: cancer knowledge and discussion of cancer risk with a physician. All of these variables are most likely related, since discussion with a physician may increase a patient's cancer knowledge, including knowledge regarding the benefit of early detection, and patients who have higher levels of knowledge may be more comfortable discussing cancer with a physician than those with low level of cancer knowledge. While many patient-targeted interventions aim to increase cancer knowledge, both patient- and physician-targeted interventions should

aim to increase patient–physician communication about cancer. Healthcare professionals who serve low-income minority women, especially in communities with few educational and health care resources, should discuss with women their personal risk of developing cancer and stress the importance of early detection for cancer survival.²⁵

Limitations of this study include the nonrandom sample of the participants and the cross-sectional study design which only documents associations and precludes causal inferences. Participants were recruited at 11 churches and may not be representative of all African American women in South Los Angeles. Although knowledge items included a “don't know” response, some respondents may have guessed answers. Despite these limitations, our community–academic partnership was able to examine perceived benefits of early detection of cancer, a construct that was of interest to our community partner and that can potentially be modified in screening promotion interventions targeting patients and physicians.

Acknowledgments

This work was supported by the Charles Drew/

University of California Los Angeles Cancer Center Partnership to Eliminate Cancer Health Disparities grant U54-CA-143931 from the National Institutes of Health/National Cancer Institute; and the National Institutes of Health, National Center on Minority Health and Health Disparities, grant U54MD007598.

Author Disclosure Statement

No competing financial interests exist.

References

1. Nelson HD, Tyne K, Naik A, et al. Screening for breast cancer: Systematic evidence review update for the US Preventive Services Task Force. Report No. 10-05142-EF-1. Rockville MD: Agency for Healthcare Research and Quality (US), 2009.
2. Smith RA, Manassaram-Baptiste D, Brooks D, et al. Cancer screening in the United States, 2014: A review of current American Cancer Society guidelines and current issues in cancer screening. *CA Cancer J Clin* 2014;**64**: 30–51.
3. Allen JD, Bluethmann SM, Sheets M, et al. Women's responses to changes in U.S. Preventive Task Force's mammography screening guidelines: Results of focus groups with ethnically diverse

- women. *BMC Public Health* 2013;**13**:1169.
4. McAlearney AS, Reeves KW, Dickinson SL, et al. Racial differences in colorectal cancer screening practices and knowledge within a low-income population. *Cancer* 2008; **112**:391–398.
 5. Bastani R, Glenn BA, Taylor VM, et al. Integrating theory into community interventions to reduce liver cancer disparities: The Health Behavior Framework. *Prev Med* 2010; **50**:63–67.
 6. American Cancer Society. Cancer incidence and death rates by race and ethnicity, US, 2006–2010. Surveillance research. American Cancer Society, Inc., 2014. Available at: www.cancer.org/acs/groups/content/@research/documents/document/acspc-041785.pdf Accessed May 1, 2014.
 7. Becker MH, ed. The health belief model and personal health behavior. *Health Educ Monogr* 1974;**2**:324–508.
 8. Chavez LR, Hubbell FA, Mishra SI, Valdez RB. The influence of fatalism on self-reported use of Papanicolaou smears. *Am J Prev Med* 1997;**13**:418–424.
 9. Hall AG, Khoury AJ, Lopez ED, Lisovicz N, Avis-Williams A, Mitra A. Breast cancer fatalism: The role of women’s perceptions of the health care system. *J Health Care Poor Underserved* 2008;**19**:1321–1335.
 10. Swinney JE, Dobal MT. Older African American women’s beliefs, attitudes, and behaviors about breast cancer. *Res Gerontol Nurs* 2011;**4**:9–18.
 11. Moser RP, Arndt J, Han PK, Waters EA, Amsellem M, Hesse BW. Perceptions of Cancer as a Death Sentence: Prevalence and Consequences. *J Health Psychol* 19:1518–1524.
 12. Christou A, Thompson SC. Colorectal cancer screening knowledge, attitudes and behavioural intention among Indigenous Western Australians. *BMC Public Health* 2012; 12:528.
 13. De Vito C, Angeloni C, De Feo E, et al. A large cross-sectional survey investigating the knowledge of cervical cancer risk aetiology and the predictors of the adherence to cervical cancer screening related to mass media campaign. *Biomed Res Int* 2014;2014:304602.
 14. Graham J, Maugh THM, II. Mammogram guidelines spark heated debate. *Los Angeles Times* November 17, 2009. Available at: www.latimes.com/nation/la-na-mammogram17-2009nov17-story.html#page=1 Accessed November 20, 2014.
 15. Stewart SL, Rakowski W, Pasick RJ. Behavioral constructs and mammography in five ethnic groups. *Health Educ Behav* 2009;**36**:36S–54S.
 16. Glenn B, Bastani R, Reuben D. How important are psychosocial predictors of mammography receipt among older women when immediate access is provided via on-site service? *Am J Health Promot* 2006;**20**:237–246.
 17. Los Angeles County Department of Public Health, Office of Health Assessment and Epidemiology. Key indicators of health by service planning area. March 2013.
 18. American Cancer Society. Cancer facts and figures for African Americans, 2013–2014. Atlanta: American Cancer Society, 2013.
 19. Lucas-Wright A, Bazargan M, Jones L, et al. Correlates of perceived risk of developing cancer among African-Americans in South Los Angeles. *J Community Health* 2014;**39**:173–180.

20. Jones L, Wells K. Strategies for academic and clinician engagement in community-participatory partnered research. *JAMA* 2007;**297**:407–410.
21. Purnell JQ, Katz ML, Andersen BL, et al. Social and cultural factors are related to perceived colorectal cancer screening benefits and intentions in African Americans. *J Behav Med* 2010;**33**:24–34.
22. Spain P, Carpenter WR, Talcott JA, et al. Perceived family history risk and symptomatic diagnosis of prostate cancer: The North Carolina Prostate Cancer Outcomes study. *Cancer* 2008;**113**:2180–2187.
23. Coulon SM, Wilson DK, Egan BM. Associations among environmental supports, physical activity, and blood pressure in African-American adults in the PATH trial. *Soc Sci Med* 2013;**87**:108–115.
24. Bandura A. Health promotion by social cognitive means. *Health Educ Behav* 2004;**31**:143–164.
25. Royak-Schaler R, Blocker DE, Yali AM, Bynoe M, Briant KJ, Smith S. Breast and colorectal cancer risk communication approaches with low-income African-American and Hispanic women: Implications for healthcare providers. *J Natl Med Assoc* 2004;**96**:598–608.

Address correspondence to:

Mohsen Bazargan, PhD Public Health Program
Charles R. Drew University of Medicine and Science
1731 East 120th Street Los Angeles CA 90059
E-mail: mobazarg@cdrewu.edu

Association Between Types of Chronic Conditions and Cancer Stage at Diagnosis among Elderly Medicare Beneficiaries with Prostate Cancer

Amit D. Raval, PhD,^{1,2} Suresh Madhavan, MBA, PhD,² Malcolm D. Mattes, MD,³ and Usha Sambamoorthi, PhD²

Abstract

The current retrospective observational study was conducted to examine the association between types of chronic conditions and cancer stage at diagnosis among elderly Medicare beneficiaries with prostate cancer using the Surveillance, Epidemiology, and End Results (SEER)-Medicare linked database. The study cohort consisted of elderly men (≥66 years) with prostate cancer diagnosed between 2002 and 2009 (N=103,820). Cancer stage at diagnosis (localized versus advanced) was derived using the American Joint Committee on Cancer classification. Chronic conditions were identified during the year before cancer diagnosis and classified as: (1) only cardiometabolic (CM); (2) only mental health (MH); (3) only respiratory (RESP); (4) CM + MH; (5) CM + RESP; (6) MH + RESP; (7) CM+ MH + RESP; and (8) none of the 3 types of conditions. Chi-square tests and multivariable logistic regressions were used to test the unadjusted and adjusted associations between types of chronic conditions and cancer stage at diagnosis. The highest percentage (5.8%) of advanced prostate cancer was observed among elderly men with none of the 3 types of chronic conditions (CM, RESP, MH). In the adjusted logistic regression, those with none of the 3 types of chronic conditions were 44% more likely to be diagnosed with advanced prostate cancer compared to men with all the 3 types of chronic conditions. Elderly men without any of the selected chronic conditions were more likely to be diagnosed with advanced prostate cancer; therefore, strategies to reduce the risk of advanced prostate cancer should be targeted toward elderly men without these conditions. (Population Health Management 2016;xx:xxx-xxx)

¹Healthcore Inc., Wilmington, Delaware.

²Department of Pharmaceutical Systems and Policy, School of Pharmacy, West Virginia University, Morgantown, West Virginia.

³Department of Radiation Oncology, School of Medicine, West Virginia University, Morgantown, West Virginia.

SAVE YOUR PROSTATE

Men over 50 should talk with their healthcare provider about the pros and cons of screening.

 prevent
cancer
FOUNDATION
www.PreventCancer.org

Introduction

Chronic conditions are highly prevalent among elderly men diagnosed with prostate cancer in the United States. Nearly one third (30.5%) of elderly men with incident prostate cancer have at least 1 preexisting chronic condition out of 16 chronic conditions included in the Charlson Comorbidity Index.¹ With regard to the types of chronic conditions, cardiometabolic conditions (diabetes and cardiovascular diseases) were the most common preexisting chronic conditions (18.1%), followed by respiratory conditions (eg, chronic obstructive pulmonary disease [COPD]) (9.8%),¹ and mental health conditions (eg, depression) (9%) among elderly men with prostate cancer.² A greater number of preexisting chronic conditions or higher chronic condition score can affect prostate cancer stage at diagnosis.³⁻⁸ However, the association between preexisting chronic conditions and cancer stage at diagnosis may differ by types of chronic conditions because of the differential pathophysiological pathways of underlying diseases and prostate cancer. For example, the presence of cardiovascular disease may increase the risk of prostate cancer as it shares common risk factors

for the development of aggressive prostate cancer, such as the presence of high cholesterol level and obesity.^{9,10}

Few studies have investigated the relationship between specific types of chronic conditions and cancer stage at diagnosis. Findings from these studies suggest that the association between preexisting chronic conditions and cancer stage at diagnosis depends on the types of chronic conditions. For example, 3 studies in the United States using population-based data found that the presence of diabetes was associated with an increase in the risk of advanced stage or grade of prostate cancer at diagnosis.¹¹⁻¹³ With respect to mental health conditions, a retrospective study found that elderly men with depression were not more likely to be diagnosed with a higher grade of prostate cancer compared to those without depression.⁹ Although these studies have highlighted the relationship between specific chronic conditions and cancer stage at diagnosis, many of these studies are outdated, single-institution database studies and suffer from the risk of detection bias because screening for prostate cancer was not included as one of the independent variables.⁵⁻⁷ Furthermore, none of these studies examined the association between types of chronic condition combinations and cancer stage

at diagnosis among elderly men. Understanding the association between types of chronic conditions and cancer stage at diagnosis is critical for patient-centered care and individualized treatment.¹⁴

Based on a review of the literature to date, it can be concluded that a knowledge gap exists in how specific combinations of conditions affect the cancer stage at diagnosis. Examining associations between combinations of chronic conditions and cancer stage at diagnosis is important because such analyses can inform practitioners on the management of cancer care in the presence of chronic conditions. Therefore, the primary objective of the current study is to examine the associations between types of preexisting chronic conditions and cancer stage at diagnosis among fee-for-service Medicare beneficiaries with incident prostate cancer. It was expected that those with multiple chronic conditions would be less likely to be diagnosed with advanced prostate cancer than those without multiple chronic conditions.

Method Study design

This study used a retrospective cohort design. The date of diagnosis of prostate cancer was considered as the

index date. Preexisting conditions were identified during the year before the index date as depicted in Figure 1.

Data sources

The current study utilized data from the National Cancer Institute's Surveillance, Epidemiology, and End Results (SEER) Cancer Registries linked with Medicare insurance claims. SEER data are considered to be the most comprehensive and high-quality population-based data on cancer incidence, initial cancer treatment, and vital status. At present, SEER data, comprising 18 population-based cancer registries, cover 24% of the US population.¹⁵ Cases of cancers are provided in a customized file, the Patient Entitlement and Diagnosis Summary File (PEDSF). Nearly 98% of cases of cancers are ascertained from medical records. Medicare is the primary health insurer for 97% of the US population age 65 years and older.¹⁶ A total of 93% of men aged 65 years and older in SEER have been linked to Medicare population enrollment records.^{16,17} At present, SEER data are released for those cases of cancer diagnosed until 2009 and their associated claims until 2010. The current study utilized cases of prostate cancer diagnosed between 2002 and 2009 and their linked Medicare claims between 2000 and 2010. Data were included for

elderly male (aged 66 years and older) fee-for-services Medicare beneficiaries.

The current study was approved by the West Virginia University Institutional Review Board in 2015. It was approved under the expedited category, which involves use of de-identified data and the requirement for consent is waived.

Study cohort

The study cohort was based on men diagnosed with incident prostate cancer between January 1, 2002, and December 31, 2009 (N = 358,439). Elderly men diagnosed with multiple cancers (N = 65,794), diagnosed with prostate cancer at the time of autopsy or on the death certificate (N = 2944), younger than 66 years of age (N = 97,159), who had unclear vital status (N = 8353), did not have continuous fee-for-service enrollment in Medicare Part A and B during the observation period (N = 74,993), and who had missing information on cancer stage at diagnosis, race, income, education, or county of residence (N = 5395) were excluded. Thus, the final cohort consisted of 103,820 elderly men with incident prostate cancer. Online Appendix 1 (available at www.liebertpub.com/pop) depicts the study cohort selection steps.

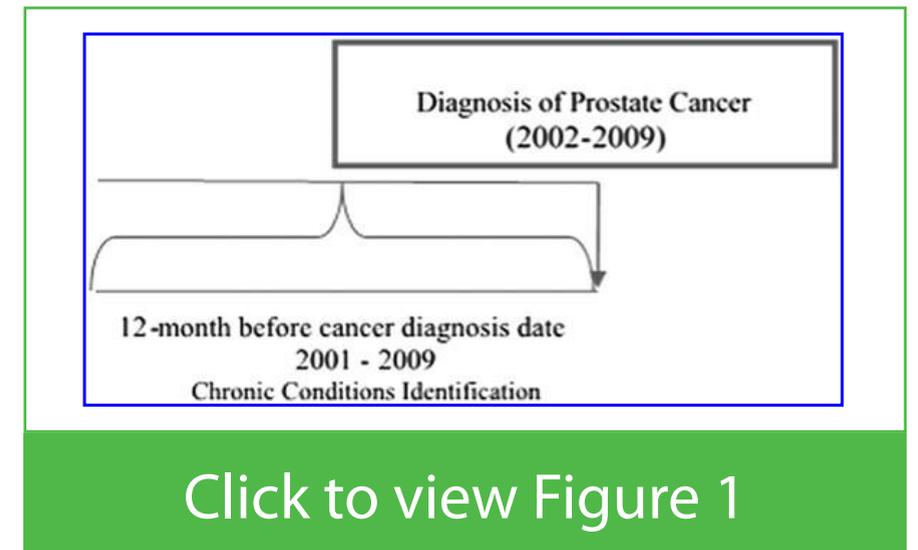


Figure 1. Schematic diagram of the study design for the current study.

Key dependent variables

Cancer stage at diagnosis (localized versus advanced stage). American Joint Committee on Cancer Tumor-Node-Metastases (TNM) classifications for staging of prostate cancer were used. Based on the TNM systems, cases were classified into 2 categories: localized and advanced prostate cancer at diagnosis. Localized prostate cancer was classified as cancer with T1 to T2 clinical stage with no regional lymph node (NX-N0) or distant metastasis (M0). Advanced prostate cancer was classified as cancer with T3 or T4 clinical stage with or without regional lymph node (N1) or distant metastasis (M1).¹⁸

Key independent variable

Types of preexisting chronic conditions. Chronic conditions were identified using 1 inpatient or 2 outpatient claims with *International Classification of Diseases, Ninth Revision, Clinical Modification* diagnostic codes and procedure codes during the year before diagnosis of prostate cancer. Several criteria were used to define clinically meaningful combinations of chronic conditions, including high prevalence, specific organ domains, common pathophysiology, and synergistic management of chronic conditions.¹⁹ Based on prior literature, the conceptual model of chronic conditions measurement, and clinician input, 12 chronic conditions were selected. These 12 chronic conditions were among the 20 conditions selected by the US Department of Health and Human Services for research, policy, program, and practice²⁰; they also were also highly prevalent among elderly men with prostate cancer. These conditions were grouped into 3 broad categories using specific organ domains, common pathophysiology, and synergistic management: cardiometabolic conditions (diabetes, coronary artery disease, congestive heart failure, and cardiac arrhythmia), mental health conditions

(anxiety, bipolar disorders, depression, schizophrenia, post-traumatic stress disorders, and psychosis), and respiratory conditions (COPD and asthma). Such types of classifications have been used in many studies.^{21–23} These 3 types of chronic conditions were then classified into 8 mutually exclusive categories: (1) cardiometabolic conditions only; (2) mental health conditions only; (3) respiratory conditions only; (4) cardiometabolic and mental health conditions; (5) cardiometabolic and respiratory conditions; (6) mental health and respiratory conditions; (7) all 3 types of conditions; and (8) none of the 3 types of conditions. (See Online Appendix 2, available at www.liebertpub.com/pop). The all 3 types of chronic conditions category was used as a reference group because those with all types of chronic conditions may have common risk factors for the development of all the 3 types of chronic conditions.

Other independent variables

All the independent variables were measured during the 1 year before prostate cancer diagnosis. The Anderson Healthcare Behavior and Utilizations Model (ABM)²⁴ was used to classify the potential independent factors associated with advanced prostate cancer. According to the ABM, health care behaviors are

determined by individuals and societal characteristics and these are characteristics are classified into 4 types of factors: (1) predisposing, (2) enabling, (3) need, and (4) external environment characteristics.

Predisposing characteristics. Predisposing characteristics represent the set of an individual's characteristics that predispose the individual to the risk of advanced prostate cancer. In the current study, demographic factors (age, race/ethnicity, and marital status) were included as predisposing characteristics. Age at the time of diagnosis was identified from the PEDSF file and was categorized into 2 groups (66 to 74 years, and ≥ 75 years). Race/ethnicity and marital also was derived from the PEDSF file and categorized into 4 groups: white, African American, Hispanic, and other. Marital status was derived from the PEDSF file and categorized into 4 groups: married, divorced/separated, unmarried, and other.

Enabling characteristics. Enabling characteristics are the set of an individual's or societal factors that enable the individual to use the services that may reduce the risk of advanced prostate cancer. For the current study, enabling characteristics were census tract-level income, census tract-level education, primary care visits,

and prostate cancer screening. Healthcare Common Procedure Coding System codes of 84152, 84154, 84153, G0103¹⁷ represented the prostate-specific antigen (PSA) test; and these codes were used to identify prostate cancer screening.

Need characteristics. Need characteristics are the set of an individual’s characteristics that determines the need to use the services that may reduce the risk of diagnosis of advanced prostate cancer. A very small percentage of men (<5%) had 42 conditions²⁵ other than the cardiometabolic, mental health, and respiratory conditions. These conditions were classified into 2 categories, “0–1 condition” and “≥2 conditions.”

External environment characteristics. External environment characteristics comprised an individual’s resident-level county, region, county-level radiation oncology units, and urology units, which provides the opportunity to seek care in order to reduce the risk of advanced prostate cancer. The 18 regions of SEER were categorized into 4 groups: (1) Northeast, which included 2 registries from Connecticut and New Jersey; (2) South, which included 5 registries from Atlanta, Greater Georgia, Kentucky, Louisiana, and rural

Georgia; (3) North-Central, which included 2 registries from Detroit and Iowa; and (4) West, which included registries from Arizona, Alaska, Greater California, Cherokee Nation, Hawaii, Los Angeles, New Mexico, San Francisco-Oakland, San Jose-Monterey, Seattle-Puget Sound, and Utah.²⁶

County-level health care resources were derived from Area Health Resource files (AHRF), which is a nationwide county-level health resource files for the United States. The file provides information for approximately 6000 county-level variables including health care facilities, health professionals, resource scarcity, health status, economic activity, health training programs, and socioeconomic characteristics.²⁶ The number of radiation oncology units and urology units in counties were used to present county-level health care resources. SEER-Medicare files were matched with the AHRF using Federal Information Processing Standards state and county codes.²⁶ For the purposes of these analyses, the quartiles of radiation oncology units and urology units were calculated.

The year of cancer diagnosis also was included as one of the independent variables.

TABLE 1. CHARACTERISTICS OF ELDERLY MEDICARE BENEFICIARIES WITH PROSTATE CANCER SURVEILLANCE, EPIDEMIOLOGY, AND END RESULTS (SEER)-MEDICARE LINKED DATABASE, 2002–2010

	Total	%
All	103,820	
Types of chronic conditions		
CM only	36,719	35.4
MH only	1940	1.9
RESP only	5421	5.2
CM + MH	2169	2.1
CM + RESP	8216	7.9
MH + RESP	416	0.4
None	48,009	46.2
All three	930	0.9
Predisposing Characteristics		
Age at diagnosis, years		
66–74	62,020	59.7
≥75	41,800	40.3
Race/ethnicity		
White	84,787	81.7
African American	11,679	11.2
Hispanic/Latino	2148	2.1
Others	5206	5.0
Marital status		
Unmarried	6954	6.7
Married	69,628	67.1
Divorced/Separated	13,599	13.1
Others	13,639	13.1

[Click to view Table 1](#)

Table 1. Characteristics of Elderly Medicare Beneficiaries with Prostate Cancer Surveillance, Epidemiology, and End Results (SEER)-Medicare Linked Database, 2002–2010

Statistical analyses

Significant differences in types of preexisting chronic conditions and advanced prostate cancer diagnosis were tested using chi-square tests. Multivariable binary logistic regressions were used to test the association between types of chronic conditions and advanced prostate cancer diagnosis after controlling for the predisposing, enabling, need, and external environment characteristics. All statistical analyses were performed using SAS version 9.4 (SAS Institute Inc., Cary, NC) in 2015.

Results

Study population

Table 1 summarizes the characteristics of the study cohort (N = 103,820). A majority of men were diagnosed with prostate cancer between age 66 and 74 years. The study cohort was primarily white and married. Nearly three quarters of men had a primary care visit and had a PSA screening during the baseline period.

Study population by types of chronic conditions

Table 2 reports the characteristics of the study population by types of chronic conditions. Overall, 53.8% of the study population had either

TABLE 2. CHARACTERISTICS OF ELDERLY MEDICARE BENEFICIARIES WITH PROSTATE CANCER BY TYPES OF CHRONIC CONDITIONS SURVEILLANCE, EPIDEMIOLOGY, AND END RESULTS (SEER)-MEDICARE LINKED DATABASE, 2002–2010

	None		CM Only		MH only		RESP Only		CM+ MH		CM + RESP		MH + RESP		All Three		Sig.	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%		
Overall	48,009	46.2	36,719	35.4	1,940	1.9	5,421	5.2	2,169	2.1	8,216	7.9	416	0.4	930	0.9		
Predisposing Characteristics																		
Age at diagnosis, years																		
66–74	31,152	64.9	20,270	55.2	1,228	63.3	3,258	60.1	1,173	54.1	4,170	50.8	252	60.6	517	55.6	***	
≥75	16,857	35.1	16,449	44.8	712	36.7	2,163	39.9	996	45.9	4,046	49.2	164	39.4	413	44.4		
Race/ethnicity																		
White	39,460	82.2	29,827	81.2	1,686	86.9	4,415	81.4	1,813	83.6	6,469	78.7	354	85.1	763	82.0	***	
African American	5,379	11.2	4,143	11.3	159	8.2	581	10.7	198	9.1	1,079	13.1	36	8.7	104	11.2		
Others	3,170	6.6	2,749	7.5	95	4.9	425	7.8	158	7.3	668	8.1	26	6.2	63	6.8		
Marital status																		
Unmarried	3,283	6.8	2,167	5.9	218	11.2	414	7.6	193	8.9	554	6.7	47	11.3	78	8.4	***	
Married	33,078	68.9	24,782	67.5	1,178	60.7	3,461	63.8	1,282	59.1	5,121	62.3	226	54.3	500	53.8		
Divorced/Separated	5,934	12.4	4,565	12.4	317	16.3	788	14.5	369	17.0	1,324	16.1	90	21.6	212	22.8		
Others	5,714	11.9	5,205	14.2	227	11.7	758	14.0	325	15.0	1,217	14.8	53	12.7	140	15.1		
Enabling Characteristics																		
Quartile of median census 2000 income																		***
\$7–\$34,522	11,533	24.0	8,625	23.5	502	25.9	1,624	30.0	627	28.9	2,540	30.9	138	33.2	331	35.6		
\$34,523–\$46,224	11,864	24.7	9,086	24.7	528	27.2	1,436	26.5	522	24.1	2,178	26.5	109	26.2	236	25.4		
\$46,229–\$62,764	12,052	25.1	9,456	25.8	453	23.4	1,262	23.3	509	23.5	1,900	23.1	100	24.0	215	23.1		
\$62,767–\$200,008	12,560	26.2	9,552	26.0	457	23.6	1,099	20.3	511	23.6	1,598	19.4	69	16.6	148	15.9		
Quartile of median census 2000 education																		***
0–8.52	13,111	27.3	9,001	24.5	508	26.2	1,135	20.9	529	24.4	1,426	17.4	85	20.4	151	16.2		
8.53–15.16	12,186	25.4	9,337	25.4	490	25.3	1,319	24.3	523	24.1	1,919	23.4	90	21.6	193	20.8		
15.17–26.09	11,512	24.0	9,331	25.4	473	24.4	1,374	25.3	506	23.3	2,263	27.5	113	27.2	249	26.8		
26.1–100	11,200	23.3	9,050	24.6	469	24.2	1,593	29.4	611	28.2	2,608	31.7	128	30.8	337	36.2		
PSA screening																		
Yes	36,251	75.5	32,144	87.5	1,632	84.1	4,642	85.6	1,852	85.4	7,044	85.7	357	85.8	759	81.6	***	
No	11,758	24.5	4,575	12.5	308	15.9	779	14.4	317	14.6	1,172	14.3	59	14.2	171	18.4		
Visit to PCP																		
Yes	32,188	67.0	28,848	78.6	1,568	80.8	4,221	77.9	1,847	85.2	6,798	82.7	356	85.6	806	86.7		
No	15,821	33.0	7,871	21.4	372	19.2	1,200	22.1	322	14.8	1,418	17.3	60	14.4	124	13.3		
Need Characteristics																		
Number of Other chronic conditions																		***
≤1	36,724	76.5	21,031	57.3	1,035	53.4	1,945	35.9	708	32.6	1,618	19.7	80	19.2	76	8.2		
>1	11,285	23.5	15,688	42.7	905	46.6	3,476	64.1	1,461	67.4	6,598	80.3	336	80.8	854	91.8		

Click to view Table 2

Table 2. Characteristics of Elderly Medicare Beneficiaries with Prostate Cancer by Types of Chronic Conditions Surveillance, Epidemiology, and End Results (SEER)-Medicare Linked Database, 2002–2010

cardiometabolic, mental health, or respiratory conditions during the year before prostate cancer diagnosis and 46.2% of the study population had none of these conditions. The majority of men had only cardiometabolic conditions, followed by men with both cardiometabolic and respiratory conditions, only respiratory conditions, cardiometabolic and mental health conditions, only mental health conditions, and mental health conditions and respiratory conditions. Significant differences in the predisposing, enabling, need, and external environment factors by types of chronic conditions were observed among elderly men with incident prostate cancer.

Types of chronic conditions and cancer stage at diagnosis

Table 3 describes the relationship between the types of chronic conditions and cancer stage at diagnosis. Overall, 94.6% of the study cohort were diagnosed with localized prostate cancer and 5.4% were diagnosed with advanced prostate cancer. Significant relationships between types of chronic conditions and cancer stage at diagnosis were observed. As compared to men with all 3 types of chronic conditions, a lower percentage of men with cardiometabolic and respiratory conditions were

diagnosed with advanced prostate cancer.

Table 3 also reports adjusted odds ratios (AOR) and 95% confidence intervals (CI) from the logistic regression on cancer stage at diagnosis. After adjusting for predisposing, enabling, need, and external environment factors among elderly men with prostate cancer, elderly men with none of the 3 conditions were 44% more likely to be diagnosed with advanced prostate cancer compared to those with all the 3 types of chronic conditions. Furthermore, elderly men with a PSA screening test during the year before diagnosis were 55% less likely to be diagnosed with advanced prostate cancer compared to those without a PSA screening test during the year before diagnosis of prostate cancer (AOR = 0.45, 95% CI = 0.43–0.48).

Discussion

One in 2 elderly men (54%) with incident prostate cancer had a preexisting chronic condition from the list of selected cardiometabolic, mental health, and respiratory conditions. The most prevalent types of chronic conditions were cardiometabolic and respiratory chronic conditions (15%). These findings suggest that elderly men with prostate cancer have significant disease

TABLE 3. NUMBER AND PERCENT WITH ADVANCED PROSTATE CANCER AND ADJUSTED ODDS RATIOS (AOR) AND 95% CONFIDENCE INTERVALS FROM LOGISTIC REGRESSIONS FOR ADVANCED STAGE DIAGNOSIS AMONG ELDERLY MEDICARE BENEFICIARIES WITH PROSTATE CANCER SURVEILLANCE, EPIDEMIOLOGY, AND END RESULTS (SEER)-MEDICARE LINKED DATABASE, 2002–2010

Types of Chronic Conditions	Cancer Stage				Sig.	Logistic Regressions on Advanced Prostate Cancer Diagnosis		
	Localized		Advanced			AOR	95% CI	Sig.
	N	%	N	%				
None	45,209	94.2	2800	5.8	***	1.44	[1.03–2.00]	*
CM only	34,916	95.1	1803	4.9		1.29	[0.93–1.80]	
MH only	1838	94.7	102	5.3		1.33	[0.90–1.95]	
RSP only	5151	95.0	270	5.0		1.32	[0.93–1.88]	
CM + MH	2086	96.2	83	3.8		0.89	[0.60–1.33]	
CM + RSP	7783	94.7	433	5.3		1.37	[0.97–1.92]	
MH + RSP	393	94.5	23	5.5		1.24	[0.71–2.17]	
All Three	888	95.5	42	4.5		Ref		

Notes: Based on 103,820 elderly men aged ≥66 years diagnosed with prostate cancer between 2002 and 2009. Significant differences by types of chronic conditions were based on the log-likelihood test using a logistic regression for adjusted models and chi-square tests for difference in the rates of stages by types of chronic conditions. Adjusted model controlled for predisposing (age, race/ethnicity, marital status), enabling (income, education, access to care, cancer screening), need (number of other chronic conditions), and external environment factors (county-level radiation unit, urology units, regions, year of diagnosis).
 CM=cardiometabolic conditions; MH=mental health conditions; RSP=respiratory conditions; Ref=reference group; Sig=level of significance.
 *** $P < .001$; ** $.001 \leq P < .01$; * $.01 \leq P < .05$

[Click to view Table 3](#)

Table 3. Number and Percent with Advanced Prostate Cancer and Adjusted Odds Ratios (AOR) and 95% Confidence Intervals from Logistic Regressions for Advanced Stage Diagnosis among Elderly Medicare Beneficiaries with Prostate Cancer Surveillance, Epidemiology, and End Results (SEER)-Medicare Linked Database, 2002–2010

burden prior to the diagnosis of prostate cancer.

In this study cohort, 1 in 10 elderly men with prostate cancer was diagnosed with advanced prostate cancer. Estimates from this study are consistent with the published literature on rates of advanced prostate cancer.^{7,27,28} In the current study, it was observed that elderly men without the commonly prevalent chronic

conditions had advanced prostate cancer at diagnosis. These study findings add to the conflicting hypotheses and findings of the relationship between the presence of chronic conditions and risk of advanced prostate cancer at diagnosis. One of the hypotheses is that individuals with chronic conditions may be less likely to be diagnosed with advanced prostate cancer because of increased contact with the health care system for care of their chronic conditions.²⁹ Conversely, the theory of competing demand postulates that the care of chronic conditions may take attention away from early symptoms of cancer and that individuals with chronic conditions may be more likely to be diagnosed with advanced prostate cancer. The role of competing demands for care of chronic conditions on advanced prostate cancer at diagnosis has been documented. For example, men with prostate cancer and preexisting congestive heart failure were more likely to be diagnosed with advanced prostate cancer compared to those without congestive heart failure.^{3,30} Although the current study found that elderly men with chronic conditions other than cardiometabolic, respiratory, or mental health conditions were 43% more likely to be diagnosed with advanced prostate cancer,

future research studies should examine the impact of less common conditions such as inflammatory-related conditions, smoking associated disorders, and sexually transmitted disease on prostate cancer risk, as these conditions also share common risk factors for developing prostate cancer.

Closer examination of the current study results suggested that elderly men who had a PSA screening test during the year before prostate cancer diagnosis were less likely to have advanced prostate cancer compared to those without a PSA screening test during the year before prostate cancer diagnosis. Furthermore, a significantly lower proportion of elderly men with none of the 3 types of chronic conditions had a PSA screening or visit(s) to a primary care physician during the year before diagnosis of cancer compared to those with the 3 chronic conditions. Taken together, these findings suggest that contact with the health care system may help improve screening for some patients and reduce the risk of advanced prostate cancer. The study's findings are consistent with the systematic review from the European Association of Urology, in which PSA screening reduced the risk of advanced prostate cancer.³¹

However, PSA screening for prostate cancer has been controversial in the United States. For example, the US Preventive Services Task Force recommends against routine PSA screening for younger men aged 50 to 69 because the harms of PSA screening outweigh the benefits in terms of reducing the risk of mortality and advanced prostate cancer diagnosis.³² In light of the controversies surrounding PSA screening, American Urological Association³³ and American College of Physicians³⁴ guidelines recommend that PSA screening should be considered through a shared-decision making process between the provider and the patient. Therefore, the current study findings suggest the need for routine PSA screening for those with none of the 3 common types of chronic conditions among elderly fee-for-service Medicare beneficiaries.

This study has many strengths. Historically, the role of chronic conditions in cancer has been examined using comorbidity indices or number of chronic conditions. The current study is the first to provide comprehensive information on the role of specific types of chronic conditions and their combinations in prostate cancer diagnosis. This study used the largest population-based

registry to assess the association between the types of chronic conditions and cancer stage at diagnosis among elderly men with prostate cancer. This study is timely and is aligned with the goals of the Office of Cancer Survivorship and the Institute of Medicine regarding the management of prostate cancer in the presence of preexisting chronic conditions.

The study findings must be interpreted in the context of limitations. As the current study used observational data, the causal associations between the presence of types of chronic conditions and cancer stage at diagnosis could not be determined. The study population was restricted to men ≥ 66 years of age; therefore, the findings cannot be generalizable to younger men with prostate cancer. Although, this study identified the presence of chronic conditions using validated codes from the literature, the clinical severity and seriousness of chronic conditions could not be determined. Furthermore, the current study utilized registry-linked administrative claims data, which either have no information or limited validity of codes to identify body mass index, exercise, and smoking status, which may be associated with severity of cancer stage at diagnosis.

Conclusion

Elderly men without cardiometabolic, mental health, or respiratory conditions were more likely to have advanced prostate cancer at diagnosis. Therefore, strategies to reduce the risk of diagnosing prostate cancer at an advanced stage need to target the subgroup without these conditions. Future research studies are needed to examine the relationship between cancer stage at diagnosis and common conditions, such as inflammation-related conditions, smoking associated disorders, and sexually transmitted disease, on prostate cancer risk, as these conditions also share common risk factors for developing prostate cancer.

Author Disclosure Statement

Drs. Raval, Madhavan, Mattes, and Sambamoorthi declared no conflicts of interest with respect to the research, authorship, and/or publication of this article.

The authors received the following financial support: This project was supported by the Agency for Health Research and Quality (AHRQ) Grant no: R24HS018622-03 and National Institute of General Medicine Sciences Grant (U54GM104942). The content is solely the responsibility of the authors and does not

necessarily represent the official views of AHRQ and the National Institutes of Health.

References

1. Edwards BK, Noone AM, Mariotto AB, et al. Annual report to the nation on the status of cancer, 1975–2010, featuring prevalence of comorbidity and impact on survival among persons with lung, colorectal, breast, or prostate cancer. *Cancer*. 2014;**120**:1290–1314.
2. Jayadevappa R, Malkowicz SB, Chhatre S, Johnson JC, Gallo JJ. The burden of depression in prostate cancer. *Psychooncology*. 2012;**21**:1338–1345.
3. Xiao H, Tan F, Goovaerts P, et al. Impact of comorbidities on prostate cancer stage at diagnosis in Florida. *Am J Mens Health*. Epub ahead of print, Dec. 26, 2014. doi: 10.1177/1557988314564593.
4. Fleming ST, McDavid K, Pearce K, Pavlov D. Comorbidities and the risk of late-stage prostate cancer. *ScientificWorldJournal*. 2006;**6**:2460–2470.
5. Oakley-Girvan I, Kolonel LN, Gallagher RP, Wu AH, Felberg A, Whittemore AS. Stage at diagnosis and survival in a multiethnic cohort of prostate cancer

- patients. *Am J Public Health*. 2003;**93**:1753–1759.
6. Xu H, Jiang HW, Ding GX, et al. Diabetes mellitus and prostate cancer risk of different grade or stage: a systematic review and meta-analysis. *Diabetes Res Clin Pract*. 2013;**99**:241–249.
 7. Prasad SM, Eggener SE, Lipsitz SR, Irwin MR, Ganz PA, Hu JC. Effect of depression on diagnosis, treatment, and mortality of men with clinically localized prostate cancer. *J Clin Oncol*. 2014;**32**:2471–2478.
 8. Severi G, Baglietto L, Muller DC, et al. Asthma, asthma medications, and prostate cancer risk. *Cancer Epidemiol Biomarkers Prev*. 2010;**19**:2318–2324.
 9. Thomas JA 2nd, Gerber L, Banez LL, et al. Prostate cancer risk in men with baseline history of coronary artery disease: results from the REDUCE Study. *Cancer Epidemiol Biomarkers Prev*. 2012;**21**:576–581.
 10. Platz EA, Till C, Goodman PJ, et al. Men with low serum cholesterol have a lower risk of high-grade prostate cancer in the placebo arm of the prostate cancer prevention trial. *Cancer Epidemiol Biomarkers Prev*. 2009;**18**:2807–2813.
 11. Abdollah F, Briganti A, Suardi N, et al. Does diabetes mellitus increase the risk of high-grade prostate cancer in patients undergoing radical prostatectomy? *Prostate Cancer Prostatic Dis*. 2011;**14**(1):74–78.
 12. Kang J, Chen MH, Zhang Y, et al. Type of diabetes mellitus and the odds of Gleason score 8 to 10 prostate cancer. *Int J Radiat Oncol Biol Phys*. 2012;**82**(3):e463–e467.
 13. Mitin T, Chen MH, Zhang Y, et al. Diabetes mellitus, race and the odds of high grade prostate cancer in men treated with radiation therapy. *J Urol*. 2011;**186**:2233–2237.
 14. Valderas JM, Starfield B, Sibbald B, Salisbury C, Roland M. Defining comorbidity: implications for understanding health and health services. *Ann Fam Med*. 2009;**7**:357–363.
 15. Surveillance, Epidemiology, and End Results (SEER) Program. SEER*Stat Database: Incidence-SEER 18 Regs Public Use, Nov. 2012 Sub (2000–2010)-Linked to County Attributes-Total US, 1969–2011 Counties. Bethesda, MD: National Cancer Institute, Division of Cancer Control and Population Sciences, Surveillance Research Program, Cancer Statistics Branch; 2013.
 16. Warren JL, Klabunde CN, Schrag D, Bach PB, Riley GF. Overview of the SEER-Medicare data: content, research applications, and generalizability to the United States elderly population. *Med Care*. 2002;**40**(8 suppl):IV3–IV18.
 17. National Cancer Institute, Division of Cancer Control and Population Sciences. SEER-Medicare: About the data files. 2013. <http://appliedresearch.cancer.gov/seermedicare/aboutdata/>. Accessed June 19, 2015.
 18. Thompson I, Thrasher JB, Aus G, et al. Guideline for the management of clinically localized prostate cancer: 2007 update. *J Urol*. 2007;**177**:2106–2131.
 19. Fortin M, Dubois MF, Hudon C, Soubhi H, Almirall J. Multimorbidity and quality of life: a closer look. *Health Qual Life Outcomes*. 2007;**5**:52.
 20. Goodman RA, Posner SF, Huang ES, Parekh AK, Koh HK. Defining and measuring chronic conditions: imperatives for research, policy, program, and practice. *Prev Chronic Dis*.

- 2013;**10**:E66.
21. Meraya AM, Raval AD, Sambamoorthi U. Chronic condition combinations and health care expenditures and out-of-pocket spending burden among adults, Medical Expenditure Panel Survey, 2009 and 2011. *Prev Chronic Dis.* 2015;**12**: E12.
22. Kadam UT, Uttley J, Jones PW, Iqbal Z. Chronic disease multimorbidity transitions across healthcare interfaces and associated costs: a clinical-linkage database study. *BMJ Open.* 2013;**3**:e003109.
23. Vyas A, Pan X, Sambamoorthi U. Chronic condition clusters and polypharmacy among adults. *Int J Family Med.* 2012;**2012**:193168.
24. Andersen RM. Revisiting the behavioral model and access to medical care: does it matter? *J Health Soc Behav.* 1995; **36**(1):1–10.
25. Piette JD, Kerr EA. The impact of comorbid chronic conditions on diabetes care. *Diabetes Care.* 2006;**29**:725–731.
26. US Department of Health and Human Services, Health Resources and Services Administration. Area Health Resources File: Overview. 2014. <http://ahrf.hrsa.gov/overview.htm>. Accessed June 19, 2015.
27. Daskivich TJ, Fan KH, Koyama T, et al. Effect of age, tumor risk, and comorbidity on competing risks for survival in a U.S. population-based cohort of men with prostate cancer. *Ann Intern Med.* 2013;**158**:709–717.
28. Ellis SD, Blackard B, Carpenter WR, et al. Receipt of National Comprehensive Cancer Network guideline-concordant prostate cancer care among African American and Caucasian American men in North Carolina. *Cancer.* 2013;**119**:2282–2290.
29. Feinstein A. The pre-therapeutic classification of co-morbidity in chronic disease. *J Chron Dis.* 1970;**23**:455–468.
30. Terret C, Castel-Kremer E, Albrand G, Droz JP. Effects of comorbidity on screening and early diagnosis of cancer in elderly people. *Lancet Oncol.* 2009;**10**(1):80–87.
31. Heidenreich A, Abrahamsson PA, Artibani W et al. Early detection of prostate cancer: European Association of Urology recommendation. *Eur Urol.* 2013;**64**:347–354.
32. Moyer VA, U.S. Preventive Services Task Force. Screening for prostate cancer: U.S. Preventive Services Task Force recommendation statement. *Ann Intern Med.* 2012;**157**: 120–134.
33. American Urological Association. AUA responds to new recommendations on prostate cancer screening. October 2011. https://www.auanet.org/advnews/press_releases/article.cfm?articleNo=262. Accessed December 31, 2015.
34. Qaseem A, Barry MJ, Denberg TD, Owens DK, Shekelle P. Screening for prostate cancer: a guidance statement from the Clinical Guidelines Committee of the American College of Physicians. *Ann Intern Med.* 2013;**158**:761–769.

Address correspondence to:

Dr. Amit Raval Healthcare Inc,
123 Justison Street Suite 200,
Wilmington, DE 19809
E-mail: amitraval.heor.wvu@gmail.com

Listening to Women: Expectations and Experiences in Breast Imaging

Susan Harvey, MD,^{1,*} Aimee M. Gallagher, MPH, MS,^{2,*} Martha Nolan, JD,^{2,†} and Christine M. Hughes³

Introduction

Those who discuss breast cancer detection and diagnosis with women know that many patients have misconceptions and anxieties about mammography. Some patients may misunderstand screening recommendations of their primary care provider or receive misinformation from friends, family, or other sources. Other women might be confused by changes or updates in official recommendations about the frequency for screening mammography or the age to begin obtaining mammograms. Still others might not be aware of breast cancer mammography screening coverage by the Patient Protection and Affordable Care Act (ACA), requiring that all new private insurance and Medicare plans eliminate cost-sharing by patients. Furthermore, healthcare providers can add to the confusion if they are not informed about the latest guidance.

Anxiety about breast cancer screening can occur especially in women who have been called back for additional tests based on an inconclusive mammogram. In a recent database review of 1,723,139 women who received a screening mammogram between January 2011 and June 2013, Alcusky and colleagues found that 15% were recalled,¹ while other studies reported recall rates between 10–14%.^{2,3} Most recalls result in “false positives,” meaning that additional testing ultimately yielded a benign outcome. Additional tests can include diagnostic mammography, breast ultrasound, breast biopsy, or magnetic resonance imaging. The majority of recalls reveal normal tissue, cysts, or other benign processes.⁴ The denser the breast tissue^{5–8} and the more annual mammograms a woman has had, the greater the probability of a callback and a false positive finding. False positives have been

SAVE YOUR CHEST

Since 1990, breast cancer mortality has decreased by 34 percent, attributable to early detection and improved treatment.

 prevent
cancer
FOUNDATION
www.PreventCancer.org

¹Director of Breast Imaging, The Russell H. Morgan Department of Radiology and Radiological Science, Johns Hopkins Medical Institutions, Baltimore, Maryland.

²Society for Women’s Health Research, Washington, DC.

³Hadley Hart Group, Chicago, Illinois.

*Dr. Harvey and Ms. Gallagher are senior coauthors and contributed equally to this manuscript.

†Current affiliation: Takoma Park, Maryland.

shown to increase patient anxiety in the short term,⁹ temporarily reduce quality of life,¹⁰ and lead to worries about breast cancer that can last for several years beyond the resolution of a false positive diagnosis.¹¹

Anxiety and fear have been reported to have a major impact on breast cancer screening behaviors.¹² As Harvey and colleagues note in a recent report, behaviors and responses to healthcare screenings can vary based on race/ethnicity and socioeconomic factors,¹³ perhaps helping to explain the greater fear of the healthcare system among African-American women.¹⁴ This undoubtedly plays a role in why African-American women present for diagnosis at later stages of breast cancer.¹⁵ We do know that almost all women experience increased anxiety when faced with finding a possible breast screening abnormality.¹⁶

Breast cancer is the most common cancer in U.S. women.¹⁷ The National Cancer Institute (NCI) of the National Institutes of Health projects 231,840 new cases of breast cancer in U.S. women and 40,290 deaths from the disease in 2015.¹⁸ NCI further estimates that 12.3% (1 in 8) of U.S. women with average risk will be diagnosed with breast cancer during their lifetime. Mortality from breast cancer has decreased significantly

since 1990, probably related to improved mammography technology and detection, increased public awareness of the value of screening, and more effective treatments. Despite these improvements, breast cancer remains a serious health concern and is the second leading cause of cancer death among all women. There is one notable exception, which is for Hispanic women, in whom breast cancer is the number one cause of cancer death.¹⁷

Mammography screening is highly effective at detecting existing disease and reducing mortality. It has been associated with a 19% reduction in breast cancer deaths.¹⁹ The likelihood that mammography will detect existing breast cancer is 70% to 90% in most women; the exception is women with dense breast tissue where the sensitivity falls to 30 to 48%.²⁰ Newer screening technologies including digital breast tomosynthesis (DBT) may yield even better results. This technology has the ability to both increase invasive cancer detection and decrease false positive results.^{4,21-24}

In 2014, The Society for Women's Health Research conducted a national survey to assess women's knowledge and attitudes regarding mammography. We sought to identify misunderstandings about mammography among women of different racial/ethnic

and age groups. We further sought to identify barriers that keep women from seeking screening mammography and motivators that would propel women toward screening. We queried participants about their emotional responses to being recalled for follow-up diagnostic testing and about what might lead them to use one mammography center over another for their breast cancer screening.

Our results clearly showed areas where there are successes and areas where there are challenges. Our results demonstrate opportunities and potential ways forward to improve access and utilization of screening mammography. The authors believe that with improved access and utilization paired with new technologies, there may be potential for improved outcomes.

Methods

To assess knowledge, attitudes, and behaviors of women in the U.S. relative to mammography, we engaged Phoenix Marketing International of Rhinebeck, New York, to design and administer a survey questionnaire. The survey was conducted in September to October 2014 to a sample of 3,501 women in four age groups—18–39 years (n = 357), 40–50 (n = 947),

51–64 (n = 1243), and 65–93 (n = 954)—and of varied race/ethnicity. Women in the youngest age group were most likely referred for mammography by a healthcare provider because of a high risk of breast cancer.

Eligible women participated by Internet via telephone interviews or through personal intercepts in public locales. The participants completed the survey, which averaged around 15 minutes online or in person, or 30 minutes over the phone. The survey was administered in English or Spanish.

Quotas were set in a number of areas to ensure similarity to the 2010 U.S. Census and mammogram utilization rates. Selection of participants was skewed toward women who have had at least one mammogram.

The survey questionnaire was pilot tested and modified to improve clarity. The final questionnaire contained questions to assess knowledge of the benefits of mammography and health insurance coverage under the ACA; to assess barriers to and motivators for acquiring a mammogram; and to assess what women want from insurance coverage and technology advances as it relates to their feelings of acquiring a screening mammogram and to being called back for additional diagnostic testing.

The questionnaire consisted of 10 screening questions such as ethnicity, income, and age to make sure sample quota were met, and 39 survey questions.

Participants self-identified as Hispanic, Black or African American, Asian, White, American Indian or Alaskan Native, Native Hawaiian or Pacific Islander, multiracial, or other. For purposes of data analysis, all but Hispanic, Black or African American, and White women were grouped as “Others.”

Hispanic and Black women were intentionally oversampled to better reveal any differences in knowledge, attitudes, and behaviors toward mammography. As such, the data were weighted to account for the oversampling. The sample intentionally does not represent the U.S. population of women.

Comparisons were made across a wide range of demographic characteristics. Other comparisons included health literacy, history of mammography, breast health, and health insurance. Statistical comparisons on data cuts were made at the 95% confidence level. The margin of error for the full sample of women is ± 1.66 . The margin of error among Black women is $\pm 4.73\%$ and among Hispanic women is $\pm 4.06\%$.

The women were queried about their health insurance

TABLE 1. PARTICIPANTS BY AGE AND RACE/ETHNICITY

Age	Hispanic	Black	White	Other	Total no. (%)
18–39	68	36	211	42	357 (10%)
40–50	155	120	618	54	947 (27%)
51–64	208	157	832	46	1243 (36%)
65+	151	116	658	29	954 (27%)
Total	582	429	2319	171	3501 (100%)

[Click to view Table 1](#)

Table 1. Participants by Age and Race/Ethnicity

status (insured or uninsured) for comparisons to frequency of mammogram (e.g., “How often do you get a mammogram?”). They were also asked to rate items on a list of possible impediments to their scheduling and keeping an appointment for mammography (e.g., high cost, lack of adequate health insurance, lack of transportation, lack of child care). Items were rated on a scale of 0–10, where 0 was strongly disagree and 10 was strongly agree.

Additional questions sought to determine women’s knowledge of the importance and timing of mammography, the awareness of the no-cost-to-patient coverage provided as a benefit of the ACA, and the motivators and barriers to seeking mammography.

“Mammography literacy” was determined by participants’ responses to questions about health benefits and risks associated with mammography (e.g., “I had one normal mammogram, so I don’t need another.”).

Knowledge of the ACA benefit (“ACA literacy”) was determined by respondents answering “yes” or “no” to a question asking, “Were you aware that mammography is provided at no cost as part of the Affordable Care Act (ACA) preventative services benefits?” ACA awareness and mammography literacy were compared across racial/ethnic and age groups and according to whether the women had a prior mammogram.

Participants were presented with a list of possible motivators (e.g., a healthcare provider’s recommendation, a friend’s recommendation, breast cancer awareness ads) for scheduling mammography and asked to rate the motivators on a scale of 0–10. Findings were further stratified by race/ethnicity. The women were also asked to respond to a list of items that would affect their selection of a site for mammography services.

Women who reported a prior mammogram were also questioned about their response (i.e., scared, stressed, sad, angry) to a callback for additional testing and

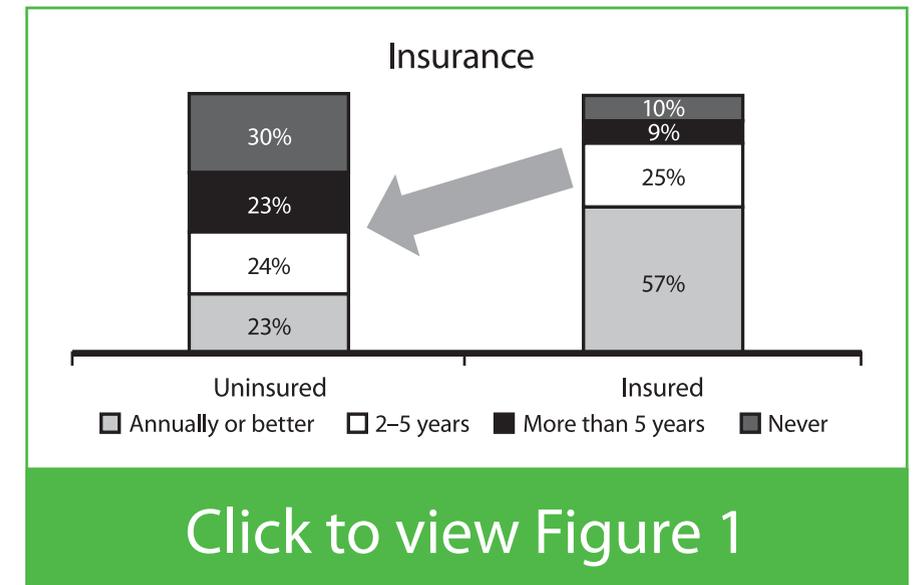
their degree of interest in advanced breast screening technologies that would lower the likelihood of a callback. SPSS software (IBM Corporation, Armonk, NY) and MarketSight software (MarketSight LLC, Newton, MA) were used to conduct the data analysis.

Results

A total of 3,501 women participated in the survey, providing information about their knowledge, attitudes, and behaviors relative to mammography. The women who participated and the weighting approach that was intentionally employed skewed the sample to include women who have had at least one mammogram.

The majority (63%) were age 51 years and older (Table 1), representing the U.S. mammogram incidence; a small number (10%) represented a younger demographic (age 18–39) that had been referred for mammography by a provider. Participants self-identified as Hispanic, Black, White, or Other (Table 1).

Although most women strongly agree that mammograms are important, many are not actually getting them. Participants rated the importance of mammography on a 0–10 scale. They either agreed (8–10 rating) that mammography is important or felt neutral



[Click to view Figure 1](#)

Figure 1. Insured women and uninsured women having mammograms were similarly likely to undergo mammography every 2–5 years (25% and 24%, respectively). Being uninsured created a disparity between ever and never having a mammogram: 30% of uninsured women compared to 10% of insured women report never having a mammogram.

or disagreed (0–7). Seventy-eight percent (78%) agreed that mammography should be conducted in addition to a breast exam by a healthcare provider and a breast self-exam. Slightly over half (54%) reported having an annual mammogram.

Women with health insurance were two times more likely than their uninsured counterparts to have an

annual mammogram (57% vs. 23%, respectively). Sources of health insurance were employer or labor union, healthcare exchange (individual, family, or business), Medicare, Medicare supplemental plan, Medicaid, or the military/U.S. Department of Veterans Affairs. A full 30% of uninsured women report never having a mammogram compared to 10% of insured women. Among uninsured and insured women who do have mammograms, 23% of the former report a 5-year gap between mammograms compared to 9% among the latter (Fig. 1).

Primary barriers to scheduling and attending mammography appointments among those women who have had mammograms were high cost (16%) and lack of adequate insurance coverage (16%). Components of cost included travel cost, wages lost, child care, and other unspecified costs. Younger women and Hispanic women report greater cost issues across the board.

The leading secondary barriers for Hispanic women were “out of the way or inconvenient” and “unable to get a referral.” For Black women, secondary barriers were mainly “lack of transportation” and “unable to get information on cost.” White women and all others

report “out of the way or inconvenient” and “lack of transportation” as their leading secondary barriers.

To assess health literacy with regard to mammography, women were asked to agree or not to agree regarding statements about mammography (Table 2). Thirty-six percent (36%) of women correctly answered at least six of seven questions (Table 2). Thirty-two percent (32%) were aware that mammography is a no-cost-to-the-consumer preventative services benefit under the ACA. The majority (63%) of women were unaware of this ACA no-cost provision; 5% were unsure.

A further breakdown by age showed that women over 50 and women with a prior history of mammography had slightly better knowledge of mammography (see Table 2 for questions) than women in the 40–50 age group, and women under 50 and those without prior mammography were less aware of ACA mammography coverage. Younger women and those with no prior mammogram represent opportunities for educational outreach.

Asked to rate 10 possible reasons for scheduling and obtaining a mammogram, the majority of respondents said that a recommendation from a healthcare provider

TABLE 2. SEVEN QUESTIONS PERTAINING TO MAMMOGRAPHY BENEFITS/ACA

- 1) Which of the following statements about mammography do you agree with the most?
 - Prevents the risk of getting breast cancer
 - Reduces the risk of getting breast cancer
 - Does not have any effect on the risk of getting breast cancer
- Rate your level of agreement with each of the following statements:*
- 2) Mammography is an important examination that should be conducted in addition to the one made by the health care provider and the woman herself.
- 3) If a mammogram does find something, it is too late.
- 4) I had one normal mammogram, so I don't need another.
- 5) I don't need a mammogram if I don't have any symptoms.
- 6) The amount of radiation exposure during a mammogram is very small and the benefits are more important than the risks.
- 7) Were you aware that mammography is provided at no cost as part of Affordable Care Act (ACA) preventative services benefits?
 - Yes, I was aware
 - No, I wasn't aware
 - No, I don't think this is true

*Correct answers (0–10 scales) means one of three points selected at the correct end of the scale for questions 2–6.

[Click to view Table 2](#)

Table 2. Seven Questions Pertaining to Mammography Benefits/ACA

(56%) and a reminder or assistance scheduling at an annual check-up (53%) were the greatest motivators.

Somewhat lesser motivators were personal medical history (40%), family history of breast cancer (38%), concern based on a self-exam (37%), breast cancer awareness ads and information (33%), a family recommendation (32%), a close friend’s history of breast cancer (26%), a friend’s recommendation (24%), and insurance company reminder (22%).

The impact of the motivators for scheduling and obtaining a mammogram differed by race/ethnicity (Fig. 2). The greatest difference was seen in the influence of family and breast cancer awareness ads and information in Hispanics and Blacks compared to Whites.

Asked about the importance of four specific factors in having a mammogram, all were rated “very important:” mammography covered by insurance, 88%; better and earlier detection, 88%; fewer unnecessary tests, 82%; and lower out-of-pocket costs, 79%.

Asked about factors that “would most likely make you want to go to a certain mammography center and least likely make you want to go there,” the highest-ranked positive factors were “fully covered under my insurance” and “has the best medical equipment.” Among the least important factors were convenient parking and

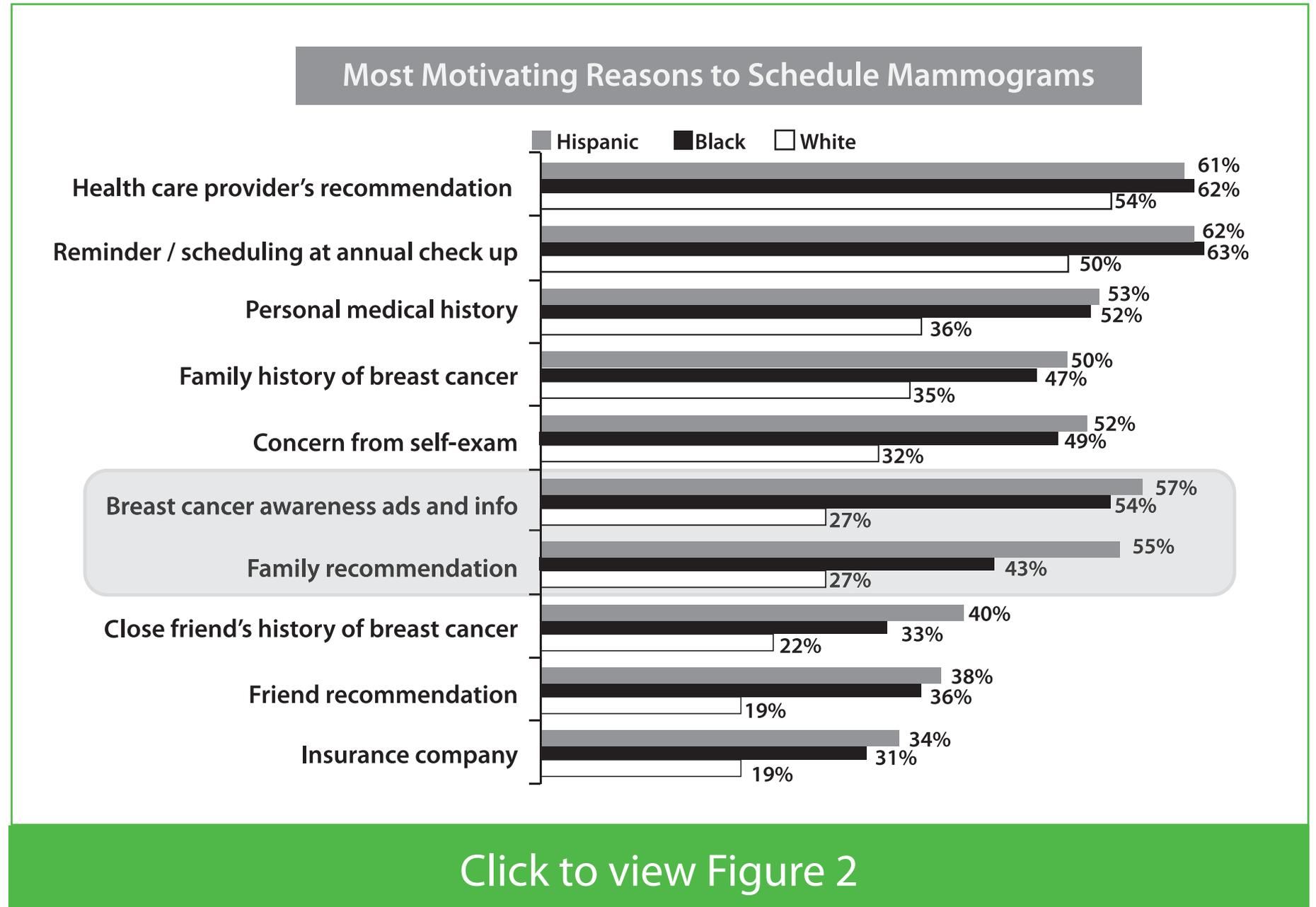


Figure 2. Motivators for scheduling mammograms differ by race/ethnicity.

recommendations from friends and family.

The emotional impact of receiving a callback for additional testing was assessed among the 47% of women who reported ever having received such a call. Eighty-nine percent (89%) were false positives. The adjectives most often attributed by the women to being recalled for follow-up testing were scared, stressed, sad, and angry. Scared and stressed were the most common responses. The emotional impact was greatest among women in their 40s (Fig. 3).

Eighty-two percent of women consider it important to have access to a mammogram that could lower the chance of having to come back for more tests; 81% consider it important to have access to a mammogram that has a better chance than current mammograms of finding breast cancer. Asked whether they would switch insurance companies if only one insurer covered the newest technology, 20% said they would be very likely to do so; 47% said somewhat likely; and 32% said not likely.

Discussion

The current survey assesses knowledge, attitudes, and behaviors of women in the United States relative

to mammography. The majority (78%) of the 3,501 participants indicated that they strongly believe that mammography is important. The survey also showed that their understanding of the benefits of mammography is low (36%), especially among Hispanic women.

The main impediments women report to their obtaining regular mammograms were high cost and lack of adequate insurance. Only 32% of participants knew that mammography is provided at no cost to patients under the ACA. Insurance coverage and education are also key factors in underutilization of mammography in this group of women.

The most common motivators for obtaining a mammography were a healthcare provider's recommendation and scheduling (or a reminder to schedule) a mammogram at an annual check-up. This is useful information to direct primary care providers on the importance of reminders.

Forty-seven percent of the women surveyed reported having received a callback at some time for additional testing, of which 89% were determined to ultimately have a benign outcome. The emotional impact of a callback was pronounced, particularly in women

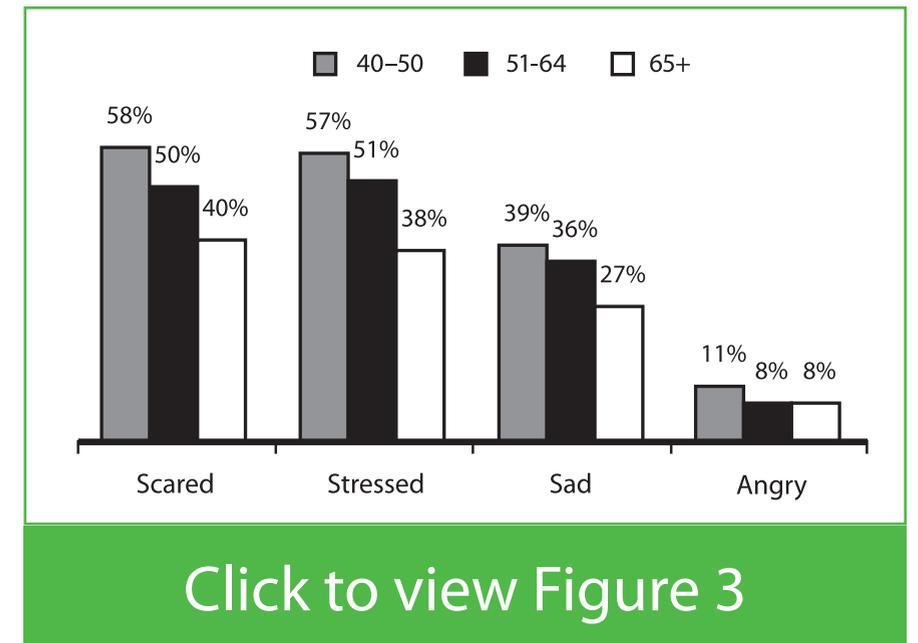


Figure 3. The emotional impact of being called back for more testing, most pronounced among women in their 40s, following an initial mammogram.

between 40 and 50. More than 80% of women expressed interest in having access to mammograms that improve detection and reduce the risk of false positives. These data show that educating women about the equipment available and the skill of the breast imager interpreting the exam will be critical to their experience.

In 2007, the NCI and the Centers for Disease Control and Prevention noted a decline in mammography rates between 2000 and 2005.²⁵ Soon afterward, SWHR brought the concerns about this finding to the attention

of the U.S. House of Representatives in a congressional briefing that focused on: (1) ensuring federal funding for research and development of improved techniques to screen breast tissue; (2) ensuring the ability of women to access accredited radiology facilities with mammography capability; (3) appropriate reimbursement rates by Centers for Medicare and Medicaid Services for mammography screening and all imaging; and (4) comprehending the impact on future health outcomes if these issues were not addressed.

Recently published research confirms the downward trend in mammography screening rates, particularly among White, Latina, and Asian women.²⁶ The findings in our survey about low health literacy with regard to mammography as well as barriers to scheduling and obtaining a mammogram may help explain some of the decline. The goal of Healthy People 2020 is a breast cancer screening rate of 81.1%.²⁷ Thus, the current data indicate the continued importance of addressing the barriers and motivators to mammography screening. Among the lesser barriers to obtaining regular mammograms were transportation, scheduling, time away from work, inability to obtain information or schedule an

appointment, and lack of child care.

Mammography literacy varied by age in our cohort. Women aged 40 to 50 were less likely to understand the health benefits of mammography (31%) than women 51–64 (39%) or 65 and older (42%). The same trend held for awareness of ACA coverage of mammography. Interestingly, women who had a prior mammogram were nearly three times more likely to understand mammography health benefits, suggesting that a mammography appointment could be a valuable opportunity for educational outreach.

Emotions play an important role in healthcare utilization and avoidance.¹² A callback for additional screening to rule out a suspicious finding on a mammogram is the source of considerable fear and anxiety for most women, according to this survey and other reports.¹⁴ The impact of fear and anxiety is no small matter for patients.²⁸ It can affect family, friends, work, and other aspects of well-being, and could conceivably contribute to uncertainty about the accuracy and value of breast cancer screening. Brodersen and Siersma found evidence of a harmful impact on “inner calmness” of false positive screening mammograms as far as 3 years afterward.¹¹ The effect could be longer as

their study only looked at the 3-year window after a false positive result.

Over 80% of women in the current survey said they would value a more accurate mammogram that eliminates callbacks and increases detection. The national callback rate in the United States is more than double that in the United Kingdom.²⁹ In 2010, the cost of callbacks in the United States were \$1.6 billion.³⁰ It is important to reduce this callback rate for cost reasons along with protecting women’s health.

The authors believe that newer breast screening technologies like DBT have the potential to provide this much needed change. It has been shown to improve breast cancer detection rates and reduce callbacks.³⁰ While it is important to note that our survey participants are not fully aware of the potential benefits, potential risks, and additional costs of these newer technologies, our survey shows that better detection of breast cancer and fewer unnecessary recalls is what women seek.^{4,21–24,31–35}

This study has several limitations. The findings may underrepresent patients who do not access healthcare services, have not received a recommendation for a mammogram from a healthcare professional, do not

speak English or Spanish, or have limited access to the internet or telephone, among other reasons. Further, the question about frequency of mammography to compare the rate of annual mammograms to the belief in the importance of mammography does not take into account that many insurance payers only permit patients to schedule mammograms after an entire calendar year has passed from the previous exam. Consequently, what women view as an annual visit may stretch into 18–24 month intervals. Current U.S. Preventive Services Task Force recommendations are for 2-year intervals in normal-risk women.

Certain incidence and prevalence rates that can be gleaned from the findings should be taken with the understanding of the limitations of the sample. The research, intentionally, does not represent the U.S. population of all women.

The survey showed that women would highly value mammography that would increase breast cancer detection and reduce false positive results.

Conclusion

Our data showed that the most significant barriers to screening mammography are the perception of high

cost and lack of adequate insurance coverage, despite the mandated coverage of screening mammography under the ACA. Our findings confirm the evidence that the ACA policy is not yet having its intended effect of removing patient barriers to mammography screening.²⁴

The survey showed that women want better accuracy from their screening mammogram and fewer additional diagnostic tests. The authors believe that expanded use of advanced breast imaging technology would address both of these issues.

The most motivating reason for scheduling a mammogram for women in this survey was a recommendation from a healthcare provider. This is an opportunity for educational outreach for the use of mammography services.

The data indicate a continuing need to improve education about the costs and insurance coverage of screening mammography and to inform women about the new technologies available that may improve breast cancer detection and that may reduce frequent costly and stressful additional diagnostic evaluations.

Acknowledgments

The authors gratefully acknowledge Elaine A. Richman, PhD, in presenting the survey findings for publication.

Author Disclosure Statement

Dr. Harvey received an honorarium from Mary Ann Liebert, Inc., publishers for her participation. The Society for Women's Health Research (SWHR[®]) was given a grant to support programmatic work related to women's attitudes and knowledge about breast cancer screening from Hologic, Inc. Dr. Harvey and Ms. Gallagher received no direct remuneration from Hologic, Inc. Martha Nolan has no financial conflicts to disclose. Ms. Hughes contracted with SWHR for this article. Mary Ann Liebert, Inc., publishers received a grant from Hologic, Inc., to revise and edit this article.

References

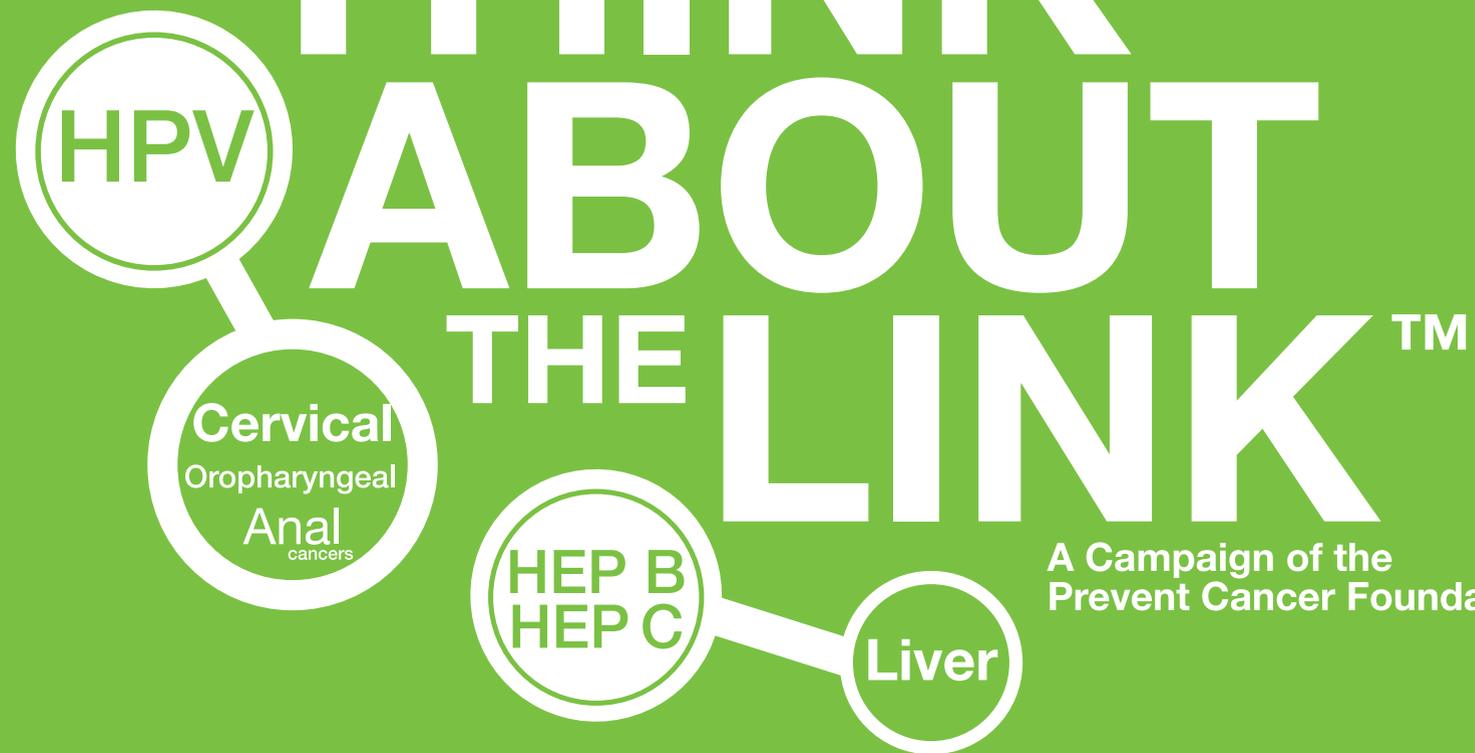
1. M Alcusky, L Philpotts, M Bonafede, et al. The patient burden of screening mammography recall. *J Womens Health* 2014;**23**:S11–S19.
2. GH Rauscher, AM Murphy, JM Orsi, et al. Beyond the mammography quality standards act: measuring the quality of breast cancer screening programs. *AJR* 2014;**202**:145–151.
3. D Gur, JH Sumkin, LA Hardesty, et al. Recall and detection rates in screening mammography. *Cancer* 2004;**100**:1590–1594.
4. SM Friedewald, EA Rafferty, SL Rose, et al. Breast cancer screening using tomosynthesis in combination with digital mammography. *JAMA* 2014;**311**:2499–2507.
5. K Kerlikowske, W Zhu, RA Hubbard, et al., for the Breast Cancer Surveillance Consortium. Outcomes of screening mammography by frequency, breast density, and postmenopausal hormone therapy. *JAMA Intern Med* 2013;**173**:807–816.
6. JG Elmore, MB Barton, VM Mocerri, et al. Ten-year risk of false positive screening mammograms and clinical breast examinations. *N Engl J Med* 1998;**338**:1089–1096.
7. RA Hubbard, K Kerlikowske, CI Flowers, BC Yankaskas, W Zhu, DL Miglioretti. Cumulative probability of false-positive recall or biopsy recommendation after 10 years of screening mammography: a cohort study. *Ann Intern Med* 2011;**155**:481–492.
8. Independent UK Panel on Breast Cancer Screening. The benefits and harms of breast cancer screening: an independent review. *Lancet* 2012;**380**:1778–1786.
9. AN Toteson, DG Fryback, CS Hammond, et al. Consequences of false positive screening mammograms. *JAMA Intern Med* 2014;**174**:954–961.
10. B Hafslund, MW Nortvedt. Mammography screening from the perspective of quality of life: a review of the literature. *Scand J Caring Sci* 2014;**23**:539–548.
11. J Brodersen, VD Siersma. Long-term psychosocial consequences of false positive screening mammography. *Ann Fam Med* 2013;**11**:106–115.
12. NS Consedine, C Magai, YS Krivoshekova, et al. Fear, anxiety, worry, and breast cancer screening behavior: A critical review. *Cancer Epidemiol Biomarkers Prev* 2014;**13**:501–510.
13. SC Harvey, A Vegesna, S Mass, et al. Understanding patient options, utilization patterns, and burdens associated with breast cancer screening. *J Womens Health* 2004;**23**:S-3–S-9.
14. ME Peek, JV Sayad, R Markwardt. Fear, fatalism and breast cancer screening in low income African-American women: the role of clinicians and the health care system. *J Gen Inter Med* 2008;**23**:1847–1853.
15. Centers for Disease Control and Prevention. Breast cancer in young African American women. Available at www.cdc.gov/healthcommunication/toolstemplates/entertainmented/tips/breastcancerafricanamerican.html Accessed August 28, 2015.
16. A Bolejko, S Zackrisson, P Hagell, C Wann-Hansson. A roller coaster of emotions and sense-coping with the perceived psychosocial consequence of a false positive screening mammography. *J Clin Nurs* 2014;**23**:2053–2062.

17. Centers for Disease Control and Prevention. Cancer among women. Available at www.cdc.gov/cancer/dcpc/data/women.htm Accessed August 18, 2015.
18. National Cancer Institute. SEER stat fact sheets: breast cancer. Available at <http://seer.cancer.gov/statfacts/html/breast.html> Accessed March 11, 2015.
19. LE Pace, NL Keating. A systematic assessment of benefits and risks of breast cancer screening decisions. *JAMA* 2014;**311**:1327–1335.
20. KM Kelly, J Dean, WS Comulada, S-J Lee. Breast cancer detection using automated whole breast ultrasound and mammography in radiologically dense breasts. *Eur Radiol* 2010;**20**:734–742.
21. P Skaane, AI Bandos, R Gullien, et al. Comparison of digital mammography alone and digital mammography plus tomosynthesis in a population based screening program. *Radiology* 2013;**267**:47–56.
22. SL Rose, AL Tidwell, MF Ice, AS Nordmann, R Sexton, R Song. A reader study comparing prospective tomosynthesis interpretations with retrospective readings of the corresponding FFDM examinations. *Acad Radiol* 2014;**21**:1204–1210.
23. P Skaane, AI Bandos, R Gullien, et al. Prospective trial comparing full-field digital mammography (FFDM) versus combined FFDM and tomosynthesis in a population-based screening programme using independent double reading with arbitration. *Eur Radiol* 2013;**23**:2061–2071.
24. S Ciatto, N Houssami, D Bernardi, et al. Integration of 3D digital mammography with tomosynthesis for population breast-cancer screening (STORM): a prospective comparison study. *Lancet Oncol* 2013;**14**:583–589.
25. NA Breen, K Cronin, HI Meissner, et al. Reported drop in mammography: is this cause for concern? *Cancer* 2007;**109**:2405–2409.
26. JF Wharam, B Landon, F Zhang, X Xu, S Soumerai, D Ross-Degnan. Mammography rates 3 years after the 2009 US Preventive Services Task Force Guidelines changes. *J Clin Oncol* 2015;**33**:1067–1074.
27. The Office of Disease Prevention and Health Prevention. Healthy People 2020 Objective Data Search. www.healthypeople.gov/2020/data-search/Search-the-Data?nid-4055 Accessed May 1, 2015.
28. NT Brewer, T Salz, SE Lillie. Systematic review: the long-term effects of false positive mammograms. *Ann Intern Med* 2007;**146**:502–510.
29. R Smith-Bindman, PW Chu, DL Miglioretti, et al. Comparison of screening mammography in the United States and the United Kingdom. *JAMA* 2003;**290**:2129–2137.
30. C O'Donoghue, M Eklund, EM Ozanne, LJ Esserman. Aggregate cost of mammography in the United States: comparison of current practice and advocated guidelines. *Ann Intern Med* 2014;**160**:145–153.
31. D Gur, AI Bandos, HE Rockette, et al. Is a ROC-type response truly always better than a binary response in observer performance studies? *Acad Radiol* 2010;**17**:639–645.
32. U.S. Food and Drug Administration. Summary of safety and effectiveness data. Selenia 3D dimensions system - Upgrade Kit. PMA P080003. 2011. www.accessdata.fda.gov/cdrh_docs/pdf8/

P080003b.pdf Accessed January 12, 2015.

33. EA Rafferty, JM Park, LE Philpotts, et al. Assessing radiologist performance using combined digital mammography and breast tomosynthesis compared with digital mammography alone: results of a multicenter, multireader trial. *Radiology* 2013;**266**:104–113.
34. ML Zuley, AI Bandos, MA Ganott, et al. Digital breast tomosynthesis versus supplemental diagnostic mammographic views for evaluation of noncalcified breast lesions. *Radiology* 2013;**266**:89–95.
35. AP Lourenco, M Barry-Brooks, G Baird, A Tuttle, MB Mainiero. Changes in recall type and patient treatment following implementation of screening digital breast tomosynthesis. *Radiology* 2014;**274**:337–342.

**VIRUSES
CAUSE
CANCER**



Vaccines, screenings and treatment can help
prevent at least 7 cancers.

www.PreventCancer.org

prevent  cancer
FOUNDATION