Cancer Screening: Guidelines and Insurance Coverage

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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 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 with regard to colorectal, breast, and cervical cancers.[1]

However, cancer remains the second-leading cause of death in the United States.[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 United States began to decline markedly by about 2% per year—the first time for half a century that the death rate fell, with larger declines in women <50 years of age.[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 are decreasing in the United States.[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, 2 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 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 their own pocket.

To address these challenges, this white paper summarizes current screening options for the 5 cancers for which screening is currently most common in the United States, provides an overview of screening guidelines by 3 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 United States.[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 cancers because it can reveal changes in the breast up to 2 years before a patient or physician can feel them.[10]

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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.[4,12–15] 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 United States.[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 a *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.[7]

Most colorectal cancers begin as a polyp, a growth in the inner lining of the colon or rectum. Polyps are common in people >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 cancers. Currently, 3 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 9 DNA biomarkers in 3 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 computed tomography (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, cancers, 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 United States.[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 United States.[3]

Prostate-specific antigen (PSA) is a protein produced by cells of the prostate gland. The *PSA test* measures the level of PSA in the 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 as normal. If a man had a PSA level >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 identify potentially 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 2 criteria must be met. First, a test or procedure must detect cancers 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 (eg, perforation with colonoscopy) or delayed (eg, 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—that is, 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—that is, 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 50 years of age.[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 the age 40 or 45 years.[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 the 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 United States Preventive Services Task Force (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]—that is, those for breast, cervical, colorectal, and lung cancers—should be treated differently from 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 3 influential advisory organizations are summarized herein.

USPSTF

The 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 years—the decision to start screening should be an individual one.
- Grade B: Women aged 50–74 years—screen every 2 years.
- Grade I: Women aged ≥75 years—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 aged 21–65 years with cytology (Pap smear) every 3 years.

or

- Grade A: Women aged 30–65 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 50–75 years—start screening at the age of 50 and continue until the age of 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 years, with a history of smoking—annual screening for lung cancer with LDCT in adults aged 55–80 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 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

The National Comprehensive Cancer Network (NCCN) is an alliance of 27 of the leading cancer centers in the United States. The NCCN Guidelines detail the sequential

management decisions and interventions that currently apply to 97% of cancers affecting patients in the United States.[42]

NCCN Guidelines

Breast/average risk[43]

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

Cervical: (The 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 years:
  - No screening
- Aged 21–29 years:
  - Cytology alone every 3 years
- Aged 30–65 years:
  - HPV and cytology co-testing every 5 years (preferred) or cytology alone every 3 years (acceptable)
- Aged >65 years:
  - No screening following adequate negative prior screening

Colorectal: average risk[45]

- Aged ≥50 years
  - 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 year 3

or

  - CT colonography

Lung: high risk[46]

- Aged 55–74 years and ≥30 pack-year history of smoking and smoking cessation <15 years

or

- Aged ≥50 years 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)
- Aged 45–75 years:
  - 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

Each year, the American Cancer Society (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 guidelines[49]

Breast

- Women aged 40–44 years should have the choice to start annual breast cancer screening with mammograms if they wish to do so.
- Women aged 45–54 years should get mammograms every year.
- Women aged ≥55 years 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 years.

Cervical

- Cervical cancer testing should start at the age of 21 years. Women <21 years of age should not be tested.
- Women between the 21 and 29 years of age 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 years should have a Pap test plus an HPV test (''co-testing'') every 5 years. Acceptable: Pap test alone every 3 years.
- Women >65 years of age 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 the age of 50 years, 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

- 55–74 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 LDCT of the chest.

Prostate

- Starting at the age of 50 years, 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 the age of 65 years should have this talk with a health care provider starting at the age of 45 years.

These 3 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 the age of 50 years, 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 the age of 50 years, the NCCN and ACS recommend annual mammography screening (the former starting at the age of 40 years, and the latter at the age of 45 years). 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 aged ≥65 years, 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 years.[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 coverage[51]

Breast

- One screening mammogram every 12 months for all women aged ≥40 years. 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 aged ≥50 years at average risk for colorectal cancer. Covered tests include FOBT, flexible sigmoidoscopy, colonoscopy, barium enema, and stool DNA test.

Lung

- Screening with a LDCT 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 >50 years of age, 1 DRE and 1 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 testing), LDCT for lung cancer screening, and several colorectal cancer screening tests (FOBT, colonoscopy, and flexible sigmoidoscopy).

Other tests—such as PSA 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

Table 1. Summary of Insurance Coverage for Common Screening Tests

	Breast		*Cervix*		*Colorectal*						*Lung*	*Prostate*	
Test	*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	30
Covered	30	13	30	29	24	30	7	30	30	15	30	28	14
Not covered	0	17	0	0	0	0	16	0	0	10	0	0	0
No policy/uncertain	0	0	0	1	6	0	7	0	0	5	0	2	16
Medicare	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
Tricare	Y	N	Y	Y	Y	Y	NP	Y	Y	N	Y	Y	Y
Department of Veterans Affairs	Y	N	Y	Y	Y	Y	NP	Y	Y	N	Y	Y	Y
Medicaid plans													
California Medicaid	Y	Y	Y	Y	Y	Y	NP	Y	Y	N	Y	Y	NP
New York Medicaid	Y	N	Y	Y	Y	Y	NP	Y	Y	N	Y	Y	NP
Texas Medicaid	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	NP
Florida Medicaid	Y	N	Y	Y	Y	Y	NP	Y	Y	NP	Y	Y	NP
Illinois Medicaid	Y	Y	Y	Y	Y	Y	N	Y	Y	NP	Y	Y	NP
Ohio Medicaid	Y	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	NP
Wellcare	Y	Y	Y	Y	NP	Y	N	Y	Y	N	Y	Y	Y
Commercial plans													
United Healthcare	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Anthem	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Aetna	Y	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y
Health Care Service Corporation	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	NP
Humana	Y	N	Y	Y	Y	Y	N	Y	Y	N	Y	Y	Y
Cigna	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	NP
Kaiser	Y	N	Y	Y	NP	Y	NP	Y	Y	NP	Y	Y	Y
Highmark Pennsylvania	Y	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
BCBS Federal Employee Plan	Y	Y	Y	Y	NP	Y	N	Y	Y	Y	Y	Y	NP

(*continued*)

Table 1. (Continued)

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*
Blue Cross Blue Shield Michigan	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	NP
Blue Cross Blue Shield Florida	Y	N	Y	Y	NP	Y	N	Y	Y	N	Y	Y	NP
Blue Shield California	Y	N	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Horizon New Jersey	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	NP	NP
CareFirst Blue Cross Blue Shield	Y	Y	Y	NP	Y	Y	Y	Y	Y	Y	Y	Y	NP
Emblem Health (HIPNY)	Y	Y	Y	Y	NP	Y	N	Y	Y	Y	Y	Y	NP
Blue Cross Blue Shield Alabama	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	NP
Blue Cross Blue Shield Massachusetts	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Blue Cross and Blue Shield North Carolina	Y	N	Y	Y	Y	Y	N	Y	Y	NP	Y	Y	Y
Blue Cross and Blue Shield Minnesota	Y	Y	Y	Y	NP	Y	N	Y	Y	N	Y	Y	Y

For breast, cervical, colorectal, and prostate cancer, insurance coverage is reported for an asymptomatic 50-year-old patient with an average risk for developing cancer. For lung cancer, the table depicts insurance coverage for an asymptomatic 55-year-old patient with a significant smoking history, as defined by the USPSTF recommendations.

While the authors endeavored to provide the most accurate and up-to-date information possible in the table, they do not warrant, represent, or in any way guarantee the validity, accuracy, timeliness, or reliability of, or the results of the use of the content or data obtained from third parties.

NP, No policy was identified during the search. Therefore, coverage status could not be verified.

FIT, fecal immunochemical test; FOBT, fecal occult blood test; CT, computed tomography; USPSTF, United States Preventive Services Task Force.

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 with 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 3 years than insured women are.[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 the twin issues of conflicting screening guidelines and variable insurance coverage for screening are address, and that lags or gaps in mandated coverage are promptly corrected. When the hurdles to effective cancer screening are surmounted, it will represent an even more impressive public health milestone as the 21st century unfolds.

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