

Cancer Screening Across the Aging Continuum

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The older population has increased by 3.2 million, or 9.4%, since 1995, and approximately 1 in 8 individuals (12.5% of the population) is older than 65 years.¹ With increased age, it is well known that there is an increased risk for the development of cancer.^{1,2} Most new cancers and cancer deaths occur in persons older than 65 years.³ Readers are referred to specific comprehensive review articles related to the science of cancer and aging.^{4,5} Specifically, these reviews address the mechanisms of aging that affect the development and suppression of cancer.

In older adults, cancer affects life expectancy and has a major effect on quality of life. Moreover, older adults who experience cancer are likely to be living with additional comorbidities such as heart disease, diabetes mellitus, dementia, or arthritis. The associated comorbidities, life expectancy, and perceived health status of these individuals influence decisions regarding screening, treatment, and ongoing cancer surveillance and care. The objectives of this article are to consider what is known about screening for cancer among older adults and to address how this knowledge can be applied to current clinical practice and to the direction of future research. Screening refers to testing in individuals who have not previously been diagnosed as having a malignancy. However, some consideration is also given to ongoing cancer surveillance, which includes patients who continue to undergo screening procedures (eg, mammography) but have already been diagnosed as having cancer.

CANCER SCREENING

There are numerous published recommendations for cancer screening among older adults, and Medicare has specific guidelines for coverage of the recommended screening tests⁶⁻¹¹ (Table 1). However, the recommendations established by the United States Preventive Services Task Force (USPSTF)¹¹ are the only ones that are solely evidenced-based. With regard to older adults, it is generally recommended that screening be based on the life expectancy of the individual, the risk vs benefit associated with screening, and the preferences of the patient or his or her caregiver.¹²⁻¹⁴ Recognizing the heterogeneity of older adults, it is critical to consider the overall health status of the individual.^{15,16}

When comorbidity, functional status, and life expectancy are taken into consideration,¹⁷ evidence supports the effectiveness of screening for cancer among older adults.^{18,19} Moreover, most older individuals (particu-

larly well-educated individuals of white race/ethnicity) realize the benefits of cancer screening and are willing to engage in screening tests.²⁰ Similar findings have been noted by B. Resnick,

Objectives: To review current screening guidelines and practice related to cancer screening among older adults and to establish a best practice approach to screening for older individuals applicable to all levels of care.

Study Design: A comprehensive literature search was performed with consideration given to research and practice.

Methods: Review article.

Results: There is some evidence to support the effectiveness of screening for cancer among older adults, particularly when comorbidity, functional status, and life expectancy are considered. Moreover, most older individuals (at least the subpopulations of well-educated individuals of white race/ethnicity) have positive attitudes about cancer screening and are willing to engage in available screening tests. However, strict adherence to any of the selected guidelines for all older individuals can result in unnecessary stress and burden to some individuals related to screening and subsequent testing. Furthermore, screening for all older adults regardless of age and status has ethical implications for the community at large.

Conclusion: Providers should take an individualized approach to screening that addresses the immediacy of the screening benefit, associated risks of screening, preferences of the patient or his or her proxy, ethical concerns (eg, the futility of screening or treatment), and the patient's life expectancy, health status, and quality of life.

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■ **Table 1.** Screening Guidelines

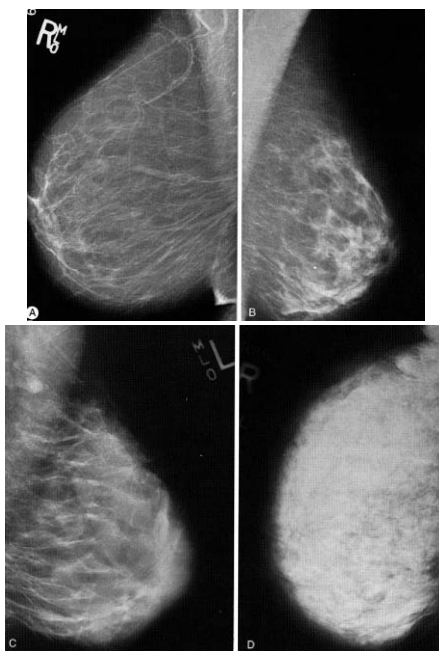
Screening	Medicare/Medicaid Reimbursement	American Academy of Family Physicians	American College of Obstetricians and Gynecologists
Mammography	Annual screening mammography for women >40 y (if eligible)	Every 1-2 y for women 50-69 y	Every 1-2 y for women >50 y
Clinical breast examination	—	Every 1-2 y for women 50-69 y	Yearly
Pap test	Pap testing and pelvic examination at 3-y intervals. Yearly screening is allowed for women who are at high risk of cervical or vaginal cancer or who have had an abnormal Pap smear in the preceding 3 y.	Every 3 y if ever sexually active	Stop screening after 3 negative test results per provider advice
Colorectal cancer screening (colonoscopy, sigmoidoscopy, DRE, and FOBT)	For individuals >50 y, screening FOBT is reimbursed by Medicare 1 time/y, and flexible sigmoidoscopy is reimbursed once every 4 y or once every 2 y if the patient is at high risk. Colonoscopy is reimbursed every 2 y if the patient is at high risk for colon cancer (no age limit). Barium enema is reimbursed as a substitute for sigmoidoscopy or colonoscopy if the primary care physician deems it advisable.	No published standards or guidelines for low-risk patients	After 50 y, annual FOBT (DRE should accompany pelvic examination); sigmoidoscopy every 3-5 y
Prostate cancer (PSA test)	Annual DRE and PSA in men >50 y	No published standards or guidelines for low-risk patients	—
Skin cancer	—	—	—

DRE indicates digital rectal examination; FOBT, fecal occult blood test; Pap, Papanicolaou; PSA, prostate-specific antigen.

Cancer Screening Across the Aging Continuum

American Cancer Society	American Medical Association	Canadian Task Force on Preventive Health Care	US Preventive Services Task Force	Overall Recommendation
Yearly for women >40y	Yearly after 50 y	Every 1-2 y for women 50-69 y	Every 1-2 y for women 50-69 y	For all women after 70 y, risk factors associated with breast cancer should be explored every 1-2 y to discuss breast cancer screening and to address the risks and benefits associated with screening, as well as the individual's comorbidities, life expectancy, health status, and quality of life
Yearly	Yearly	Every 1-2 y for women 50-69 y	Optional	Optional
Women ≥70 y who have had ≥3 normal Pap test results in a row and no abnormal Pap test results in ≥10 y may choose to stop screening	Annual screening until there have been 3 negative test results, and then screening may be done less frequently per provider advice	Pap test annually beginning at 18 y or following initiation of sexual activity; after 2 normal Pap test results, perform Pap tests every 3 y to 69 y	If normal result, discontinue after 65 y	If Pap test results have been normal, stop testing at 65 y
After 50 y, yearly FOBT plus flexible sigmoidoscopy and DRE every 5 y or colonoscopy and DRE every 10 y or double-contrast barium enema and DRE every 5-10 y	Annual FOBT beginning at 50 y and flexible sigmoidoscopy every 3-5 y beginning at 50 y	No recommendations	After 50 y, yearly FOBT and/or sigmoidoscopy and DRE are not recommended for the general population	For all adults after 50 y, risk factors associated with colorectal cancer should be explored every 1-2 y to discuss the risks and benefits associated with screening, as well as the individual's comorbidities, life expectancy, health status, and quality of life
Offer annual DRE and PSA screening beginning at 50 y to men who have a ≥10-y life expectancy and to younger men at high risk	Provide information regarding the risks and potential benefits of prostate screening	PSA and DRE tests are not recommended for the general population	PSA and DRE tests are not recommended for the general population	PSA and DRE tests are not recommended for the general population. Risk factors for prostate cancer should be explored every 1-2 y to discuss the risks and benefits associated with screening, as well as the individual's comorbidities, life expectancy, health status, and quality of life
Skin examination yearly if ≥40 y	Skin self-examination monthly; individual schedules of testing	Insufficient evidence to recommend for or against total-body skin examination or self-examination; counsel on avoiding sun exposure and wearing protective clothing	Insufficient evidence to recommend for or against total-body skin examination or self-examination; counsel on avoiding sun exposure and wearing protective clothing and self-screening	Insufficient evidence to recommend for or against skin examination

■ **Figure.** Mammograms Showing Increasing Breast Density



Fatty breast tissue has fewer areas of density (white areas on the mammogram) that can obscure a suspicious area. This figure was originally published in Bland KI, Copeland E III. *The Breast: Comprehensive Management of Benign and Malignant Disease*. 2nd ed. WB Saunders; 1998:656. Reprinted with permission from Elsevier. Copyright 1998.

PhD (unpublished data, 2007). However, it is apparent that adherence to screening guidelines for all older individuals may not always be in the best interest of the individual because the tests may result in unnecessary stress, morbidity, and even mortality without affecting the life span.^{16,21,22} Conversely, there may be a decrease in quality of life (eg, pain from a tumor or other consequences of a missed malignancy) associated with not screening a particular individual based purely on health status and life expectancy. For example, performing breast cancer screening in an 85-year-old woman in the upper quartile of health status and life expectancy (ie, those in better health with a >20-year life expectancy) is more likely to be beneficial for that particular individual compared with breast cancer screening in a 75-year-old woman in the lower quartile of health status and life expectancy (ie, those in worse health with a <3-year life expectancy).¹⁶

Breast Cancer Screening

The USPSTF¹¹ recommends a screening mammography (with or without clinical breast examination) every 1 to 2 years for women 40 years and older. There is insufficient evidence to recommend for or against routine clinical breast examination without mammography to screen for breast cancer.¹¹ Mammo-

grams optimally identify tumors when the breast tissue is fatty, as occurs in the postmenopausal woman. Fatty breast tissue has fewer areas of density (white areas on the mammogram) that can obscure a suspicious area (Figure). For this reason, the sensitivity of mammography increases as a woman ages.⁷

Screening recommendations related to breast cancer do not address the potential risks of performing mammography in older adults. These risks include undergoing additional tests and biopsies associated with false-positive test results, emotional distress and anxiety, and exposure to futile evaluations and treatments.^{23,24} For example, if a breast malignancy is found in a frail older adult with limited life expectancy, treatment options may be limited and may engender significant morbidity or even mortality.

Mammography has a high false-positive rate and is unable to detect about 5% of breast cancers.⁷ Because of this, other screening modalities are being explored such as the use of dual-energy x-ray absorptiometry to accurately detect breast density²⁵ and the use of breast density to help determine the risk of breast cancer.²⁶⁻²⁸ The measurement of breast density, along with other known risk factors associated with breast cancer diagnosis such as age, race/ethnicity, family history of breast cancer, a prior breast procedure, body mass index, natural menopause, the use of hormone therapy, and a false-positive mammogram in the past, can be used to help identify those at particular risk.²⁸ Alternatively, magnetic resonance imaging has been used to detect breast cancer (particularly in situations in which mammography alone has poor sensitivity),²⁹ to help identify age-related changes in the breast,³⁰ or to detect local chest wall tumor recurrence after mastectomy.³¹ Magnetic resonance imaging is recommended by the American Cancer Society as an adjunct to mammography in women at high risk for breast cancer.²⁷ However, there is no evidence to suggest the usefulness of this type of testing in older adults.³² Likewise, digital or computer-aided diagnostic mammography, while more accurate in identification of breast tumors in younger women, has not been shown to be advantageous for older women.³³

Mammography Surveillance Recommendations in Breast Cancer Survivors

There are approximately 2 million women with a known diagnosis of breast cancer, more than half of whom are older than 65 years.³⁴ Most of these women had no metastatic disease at diagnosis but are at risk for local or systemic recurrence. In addition, after an initial diagnosis of breast cancer, a woman is at an approximately 2-fold increased risk for a second breast cancer, which may be in the same breast if breast-conserving surgery was used or in the ipsilateral breast.³⁵ Guidelines for follow-up include an annual history, a physical

examination, and a surveillance mammogram.⁷ In a study²³ that included a sample of 1846 older women with stage I and stage II breast cancer, there was a 0.69-fold decrease in the odds of breast cancer mortality with each additional surveillance mammogram and an almost one third reduction in the mortality rate. The protective association of a surveillance mammogram was strongest among those with stage I disease, those who had a mastectomy, and those in the oldest age group (≥ 85 years). As with initial breast cancer screening, surveillance screening should consider the individual's comorbidities, life expectancy, health status, and quality of life.

Colorectal Cancer Screening

As summarized in Table 1, recommendations for colorectal cancer screening include the following screening options^{6,8,9,11,36,37}: annual fecal occult blood test, flexible sigmoidoscopy once every 4 years or once every 2 years if the patient is at high risk, or colonoscopy every 2 years if the patient is at high risk for colon cancer (no age limit). Barium enema can be a substitute for sigmoidoscopy or colonoscopy if this is more advisable for the patient. There is no evidence to support the recommendation of one type of screening procedure over another.

Given that 90% of all cases of colon cancer occur after age 50 years, all older adults are at risk. Screening for colorectal cancer focuses on identifying premalignant adenomatous polyps. It is believed that this type of polyp will progress from an adenoma to cancer during 5 to 10 years. Therefore, screening for colon cancer has a particular advantage in that it is more likely to prevent the occurrence of cancer rather than just to identify disease once it is present.

Newer screening techniques may affect future outcomes of colorectal cancer screening and are particularly important with regard to screening older adults with associated comorbid conditions that increase their risk of false-positive testing results. The Hemosure (Hemosure Inc, El Monte, Calif), a new immunochemical fecal occult blood test, reportedly has higher sensitivity and specificity than the traditional guaiac-based chemical method of testing.³⁷ Blood in the stool is not always indicative of cancer because blood may be present due to several common problems noted in older adults such as the presence of hemorrhoids or diverticular disease. Stool testing based on a tumor-derived enzyme, pyruvate kinase, which is present in shed tumor cells, has also been investigated as a noninvasive colorectal cancer screening.³⁸ This method produced an 85% sensitivity for colon cancer (56% for rectal cancer), with a specificity of 79%. The potential use of this test for early detection of colon or rectal cancer merits further investigation as a replacement for the fecal occult blood test.

Alternatively, some newer approaches to screening include screening for DNA mutations in shed colonic epithelial cells present in the stool.^{39,40} DNA is a useful marker because it is not degraded during passage through the colon and is present intact in the stool. Fecal DNA testing using a panel of multiple genes known to be mutated in colorectal cancer has shown greater sensitivity than guaiac-based occult blood tests for noninvasive colorectal cancer screening.⁴¹ Virtual colonoscopy, or computed tomography colonoscopy, is another new technique using 3-dimensional images constructed from computed axial tomography images.⁴² This procedure is less invasive than colonoscopy; however, the necessary bowel preparation is the same, and any positive finding will need to be followed up with colonoscopy.

As with breast cancer, there are no age cutoffs in screening for colorectal cancer based on clinical or cost analysis data.⁴³ A recent study⁴⁴ that included 1353 patients 70 years or older who had 2 colonoscopies at least 12 months apart noted that a history of polyps and advancing age were strong risk factors for colorectal neoplasia development in older patients. Therefore, screening of individuals with a history of neoplasias should be considered regardless of their age. However, it is critical to consider an individual's comorbidities, life expectancy, health status, and quality of life.

Cervical and Prostate Cancer Screening

The USPSTF¹¹ and the American Cancer Society⁶ recommend against screening women older than 65 years for cervical cancer if they have had negative test results in the past and have no risk factors for cervical cancer such as a history of cervical cancer, immunosuppression, diethylstilbestrol exposure before birth, or documented human papillomavirus infection. Older women who have never had a Papanicolaou (Pap) test should be screened annually until there are 2 negative test results (Table 1). These recommendations are based in part on new data implicating human papillomavirus as a cause of almost all cases of cervical cancer. The natural history of human papillomavirus infection and the long latency between infection and development of cervical cancer⁴⁵ imply that older women with at least 2 negative Pap smear results and no evidence of human papillomavirus infection are at extremely low risk.

There are no consistent recommendations regarding screening for prostate cancer (Table 1). The American Cancer Society⁶ recommends a digital rectal examination and prostate-specific antigen (PSA) test annually for all men older than 50 years. Men who have a first-degree relative with prostate cancer or individuals who have urinary symptoms should be considered at high risk, and testing should be encouraged. Combining digital rectal examination with a

PSA test has been noted to be more effective than either test alone.⁴⁶ Based on findings indicating that PSA testing measures an increase in prostate size rather than the presence of prostate cancer tumors⁴⁷ and the lack of evidence that PSA testing improves outcome,⁴⁷⁻⁴⁹ the USPSTF⁴³ in 2002 concluded that there was insufficient evidence to recommend for or against routine PSA screening. Further preliminary findings from the Prostate, Lung, Colorectal and Ovarian cancer screening trial⁴⁸ indicate that (compared with annual PSA screening) PSA screening every 5 years in men with a baseline PSA level of less than 1 ng/mL (to convert PSA level to micrograms per liter, multiply by 1.0) and every 2 years for men with a PSA level of 1 to 2 ng/mL could result in a 50% reduction in PSA tests (compared with annual screening). This reduction in PSA tests would miss identifying fewer than 1.5% of men whose PSA level rose to greater than 4 ng/mL during the screening interval. However, the effect of this level of screening on prostate cancer mortality is not known.⁴⁸

The indolent nature of many low-grade prostate cancers has contributed to a 10-year survival rate of approximately 89.2% in men diagnosed as having prostate cancer at 65 years or older.⁴⁹ Therefore, many more men are diagnosed as having prostate cancer than die of it.⁵⁰ Consequently, the value of intensive screening regimens for older men with limited life expectancy is doubtful.

Other Cancers

The USPSTF¹¹ recommends against the routine screening of adults for bladder, lung, oral, ovarian, pancreatic, skin, or testicular cancers. Studies such as the ongoing Prostate, Lung, Colorectal and Ovarian cancer screening trial will provide data to help guide future screening recommendations in these areas. For example, preliminary findings from the Prostate, Lung, Colorectal and Ovarian cancer screening trial⁵¹ for ovarian cancer screening indicate that screening with transvaginal ultrasonography and with CA-125 level had positive predictive values for invasive cancer of 3.7% for an abnormal CA-125 level, 1.0% for an abnormal transvaginal ultrasonography finding, and 23.5% if both test results were abnormal. Overall, the predictive value of both tests was low. However, given the higher rate of occurrence for most cancers in older adults, healthcare providers should routinely consider the possibility of cancer within differential diagnoses across various clinical symptoms.

CURRENT SCREENING PRACTICES IN OLDER ADULTS

Although generally lower than the cancer screening rates reported among younger adults, screening rates as recommend-

ed by the USPSTF varied among older adults based on factors such as socioeconomic status and frailty.^{16,22,52} The percentage of older individuals who were up-to-date with screenings likewise varied depending on the state in which the individual lived.⁵³ Furthermore, there is some concern that older adults, particularly the old old (≥ 85 years), may be overscreened given their health status and life expectancy.²⁴ In studies^{8,12,16,20,22,54,55} focused on screening for prostate, breast, and cervical cancer, there was some decline in the incidence of screenings among those with advanced age, but there was not a significant difference among these older individuals undergoing screening based on health status.^{16,22} For example, among men 85 years or older, 34% in the best health had a PSA test compared with 36% in the worst health. Among women tested for breast or cervical cancer, there was no difference in screening behavior among those 80 years or older based on health status.

FACTORS ASSOCIATED WITH ADHERENCE TO SCREENING GUIDELINES

Provider Factors

Some of the persistence in screening of older adults, regardless of comorbidities and health status, may be due to the fact that there are no good models for predicting life expectancy beyond the effect of age. Furthermore, providers may interact with individuals who have multiple comorbid conditions more frequently than healthy older individuals, thereby providing more opportunity for screening to be addressed and encouraged. It is similarly possible that older adults continue to request screening or that providers fear potential litigation or some negative effect for not adhering to screening guidelines.^{16,20,22,52,56}

There are some specific healthcare provider characteristics that may influence whether screening occurs. Heflin et al,⁵⁴ following administration of a survey that included 2003 physicians, reported that overscreening with mammography testing was more common than underscreening among female physicians and among those who were not board-certified geriatricians. In addition, healthcare providers seem to serve as mediators for screening decisions made by older adults.^{57,58} The patient-provider relationship (eg, such things as the level of trust between the patient and the provider) may have a greater influence on screening outcomes than the independent characteristics of the provider or the patient.⁵⁹

Patient Factors

Several variables have been associated with older adults' willingness to engage in cancer screenings. These include

socioeconomic factors and access to services,^{53,60-63} beliefs and attitudes about screening,^{24,59,60} encouragement by a health-care provider,^{20,52,64,65} and a relationship with a “personal” primary care provider.^{53,61,62} Generally, nonwhite racial/ethnic groups undergo less screening than white subjects,^{53,66,67} and individuals with higher incomes and more years of education are more likely to undergo screening.^{24,53}

Although Medicare coverage of colon screening did not seem to change screening behaviors, adults with insurance coverage were 2 to 3 times as likely to undergo screening.^{63,67-69} Individuals living in areas in which access to managed care programs was high were more likely to undergo screening. Conversely, being dually eligible with both Medicare and Medicaid coverage resulted in a lower likelihood of screening.⁷⁰ Those who are dually eligible tend to be older, female, and have lower socioeconomic status (eg, lower education), all of which may have influenced screening behavior.

The perceptions that older individuals have about their health status may be relevant to decisions regarding screening, although consistently there has not been a significant difference in screening rates among individuals in varying states of health.^{12,16,22,70} A survey of 105,860 older adults from the 2002 Behavioral Risk Factor Surveillance System data showed that those who perceive their health to be fair or poor were more likely to undergo screenings than those who reported good, very good, or excellent health.^{20,53} The reasons for increased screening among those with fair or poor health may be related to such things as access to services and trust in providers.

CURRENT PHILOSOPHY OF CARE RELATED TO CANCER SCREENING IN OLDER ADULTS

Preference for screening among patients and rationale for recommending screening vary among individual patients and providers.⁷¹ Consequently, there is some interest in the use of a shared decision-making process to optimally help older individuals make screening-related decisions.^{20,71-75} Older adults, particularly those with poorer perceived health, expressed an interest in discussing cancer screening risks and benefits with their primary healthcare provider.⁷⁴

Knowledge about screening tests and about the associated risks and benefits with screening is not the only factor to influence screening behavior. Older adults make decisions regarding screening based on what they believe about screening outcomes.^{24,76} Unfortunately, these beliefs may be unrealistic such as the belief that screening will prevent them from getting

cancer.^{20,77} Such beliefs should be discussed and misconceptions corrected before making a definitive screening decision.

Not all patients are interested in taking or are willing to take an active or collaborative role in their healthcare decisions. Whether or not the individual is willing to participate in a shared decision-making process, an individualized approach to decision making should be considered.^{8,12,16,22,52,71,76,78,79} This approach moves beyond age and life expectancy and includes the consideration of such things as health status, comorbidities, and quality of life.

ETHICAL CONCERNS ASSOCIATED WITH SCREENING

An individualized approach to decisions about screening certainly seems logical as a way to best meet the needs of older individuals with regard to cancer screening decisions. However, it is anticipated that there will be an increased number of persons 65 years and older from 2010 to 2030,⁸⁰ and this may translate into increased numbers of older individuals electing to continue with screening. The consequences of such decisions may have a significant economic effect and may raise ethical concerns.

Ethics refers to a framework or guideline for determining what is morally good (ie, right) or bad (ie, wrong). Ethical problems arise when there is conflict about what is the “right” thing to do. This occurs when decisions need to be made regarding whether a medical intervention (eg, a colonoscopy) is futile. Medical futility is described as a proposed intervention (eg, testing, pharmaceutical treatment, or surgical intervention) that should not be performed because available data show that it will not improve the patient’s current or future condition.⁸¹ Unfortunately, there is no consensus as to the statistical threshold for a treatment to be considered futile. If excessive resources are used to screen older adults, fewer resources may be available for other types of health promotion activities or medical interventions that might be more beneficial for other populations.

FUTURE DIRECTIONS

Based on recommendations for screening from multiple organizations (Table 1) and on current knowledge associated with screening, we developed some general guidelines to follow when making screening decisions with older adults (Table 2). Most important, providers should take an individualized approach to screening that addresses the immediacy of the screening benefit, associated risks of screening, preferences of the patient or his or her proxy, ethical con-

cerns (eg, the futility of screening or treatment), and the patient's life expectancy, health status, and quality of life.

From a research perspective, we have not adequately considered screening and the effect of screening among older adults, particularly among the old old (≥ 85 years). At the most basic level, we need to be vigilant to include older adults, particularly the old old, in ongoing testing of the effectiveness and cost-benefit of newer types of screening.

We must continue to develop our understanding of how to evaluate comorbidities in older individuals and how screening may be related to comorbidities, underlying health status, and quality of life. We can no longer consider age as a 1-dimensional construct. Rather, an individual's function, frailty, and resilience are critical factors that likely influence the usefulness of cancer screening. Research is needed to develop clinical tools that integrate age, risk of cancer, life expectancy, and comorbidity to help healthcare providers work with patients to make informed decisions about screening.

Cancer screening in the context of genomics has likewise been largely ignored with regard to older adults. The most common hereditary cancer syndromes are hereditary breast

and ovarian cancers and nonpolyposis colon cancer. These syndromes usually result in cancer development at younger ages. Therefore, careful evaluation of the cost-benefit ratio of genetic screening for those 65 years and older is needed.

Another area that has been ignored among older adults is cancer surveillance, which is relevant for individuals who have survived 1 or multiple types of cancers. Particularly critical is the relationship between cancer surveillance and health status or life expectancy. For example, what is the risk-benefit to continued screening of an 85-year-old woman who is a 20-year survivor of breast cancer given her current health status and life expectancy?

With the increase in life expectancy among older adults, it is equally important that we explore the effect of screening vs not screening on the quality of life and cost of care of these individuals. Regardless of age, health status, life expectancy, or current quality of life, undetected colorectal cancer may cause pain and inability to eat that might have been avoided if a polyp or smaller tumor was identified and removed. Research is needed to establish if it is better to provide chemoprevention or to identify and treat early-stage cancers in older adults with, for example, tailored radiation therapy, brachytherapy, or hormone therapy. Chemoprevention has been shown to be effective among those 60 years and older, although the risk of adverse events (eg, deep vein thrombosis) was also increased among these older individuals.^{82,83} Treatment at late stages of cancer or for associated complications may be more costly than screening and intervention at an earlier time point.

■ **Table 2. General Guidelines for Cancer Screening Decisions in Older Adults**

1. For patients who have a life expectancy of < 10 y, the focus of care should be on managing conditions in which the treatment is likely to be of immediate benefit rather than on screening for asymptomatic disease.
2. Older patients with multiple medical problems, chronic pain, or dementia may find routine screening tests to be more stressful than younger patients. This potential increased burden needs to be considered in screening decisions.
3. Screening decisions for older adults should be individualized rather than set strictly by age. The expected benefit of the screening test should be considered against the risk for each patient. Factors to consider include the immediacy of the screening benefit, the patient's life expectancy, and the patient's preferences (or, as appropriate, those of the proxy).
4. Coverage for screening procedures should not restrict coverage for older adults on the basis of age alone.
5. For ethical reasons, futility of care should be considered when decisions on screening or cancer treatment are being determined.
6. Quality assessment and quality improvement systems that use rates of screening tests in defined subpopulations as a performance indicator should not include older individuals for whom screening is unlikely to be of benefit.
7. Older patients should have access to screening tests for prognostic information, to inform families, and for future healthcare planning if that is their wish.
8. Screening should not assume that the individual wants to undergo treatment, and options should be provided that include treatment risks and benefits, as well as the risks and benefits associated with no treatment.

CONCLUSIONS

Based on the current screening guidelines as established by the USPSTF along with others (Table 1), we recommend the following: (1) For women older than 70 years, risk factors associated with breast cancer should be explored every 1 to 2 years, and a discussion about breast cancer screening may be initiated that addresses the risks and benefits associated with screening and the individual's comorbidities, life expectancy, health status, and quality of life. (2) Women 65 years and older should cease getting Pap tests if they have had normal test results up to this age. (3) For adults older than 50 years, risk factors associated with colorectal cancer should be explored every 1 to 2 years and considered in light of the risks and benefits associated with screening and the individual's comorbidi-

ties, life expectancy, health status, and quality of life. (4) For men 50 years and older, the risk factors associated with prostate cancer should be reviewed every 1 to 2 years, and PSA test and digital rectal examination may be discussed in light of the risk and benefits associated with screening, comorbidities, life expectancy, health status, and quality of life. Routine screening for other types of malignant neoplasms is not recommended for older adults. Given the current state of the science, the general guideline for cancer screening among older adults should be to use an individualized approach that incorporates the ethical issues of futility of care. Ongoing research is needed to provide additional information to guide providers and older adults in these decisions.

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Take-away Points

With regard to older adults, it is generally recommended that screening be based on the life expectancy of the individual, the risk vs benefit associated with screening, and the preferences of the patient or his or her caregiver.

- Screening for breast, prostate, and colorectal cancer should be addressed with older adults as per our guidelines.
- Women 65 years and older with normal Papanicolaou (Pap) test results up to this age should cease getting Pap tests.
- Routine screening for other types of malignant neoplasms is not recommended for older adults.

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