Individualized Decision-Making for Preventive Medicine in Older Adults

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28.1 AAMC Competency

The graduating medical student, in the context of a specific older adult patient scenario, must be able to:

Health Care Planning and Promotion	
15	Accurately identify clinical situations where life expectancy, functional status, patient preference, or goals of care should override standard recommendations for screening tests in older adults.

28.2 Cases

Consider the following two patients who present to establish primary care. While the two patients are of the same chronologic age, they differ substantially in their comorbidities and functional status. We will use these contrasting patient presentations to help illustrate clinical situations where life expectancy, functional status, patient preference, or goals of care should override standard recommendations for screening tests in older adults.

Case 1

Mr. Jones is a 75-year-old male who presents to establish care. Overall, he feels well, "just slower than I used to be."

Past Medical History:

- Coronary artery disease (status-post stent placement 8 years ago and again 2 years ago)
- Ischemic cardiomyopathy (ejection fraction of 30%)
- Atrial fibrillation (diagnosed when patient presented with a stroke 5 years ago)
- Cardioembolic stroke with residual deficits
- Hypertension
- Hyperlipidemia
- Type II diabetes mellitus (complicated by nephropathy, retinopathy, and neuropathy)
- Chronic obstructive pulmonary disease
- Benign prostatic hyperplasia

Medications:

- Aspirin
- Coumadin
- Lisinopril
- Carvedilol
- Nifedipine
- Atorvastatin
- Metformin
- Glargine
- Gabapentin
- Budesonide/formoterol
- Albuterol as needed
- Tamsulosin

Social History:

Mr. Jones lives in an apartment with his wife, who is in charge of all finances, helps with his medications, and all other household chores, "I don't do much around the house." Since his stroke, he has had a caregiver who comes twice a week to help with bathing. He has a shower chair and uses a walker, "I use the walker most when I need something to rest on when I'm out and about."

- Current smoker, 1 pack daily for 50 years. "I've quit in the past, but after my stroke I started up again and haven't been able to drop it again."
- An occasional beer over the holidays.

Physical Exam:

- Vitals: BP 145/81, HR 63, afebrile, weight 210 lbs, height 5′10″ (BMI 30).
- General: Obese, pleasant male, short of breath after walking from the waiting room to the exam room.
- Eyes: Arcus senilis. Pupils equal and reactive to light. Spectacles in place.
- HENT: Well-fitting dentures in place, oropharynx clear. Cerumen impaction bilaterally.
- Cardiovascular: Irregularly irregular. S4 present. 2/6 early-peaking crescendo-decrescendo murmur, loudest at right upper sternal border, without radiation. Jugular venous pressure 9 cm H_2O at 30 degrees. 2+ symmetrical radial and posterior tibial pulses bilaterally.
- Pulmonary: 1 sentence dyspnea. No use of accessory muscles. Distant breath sounds bilaterally, with faint bibasilar crackles. No wheezing.
- Abdominal: soft, nontender
- Neurologic: Cranial nerves II–XII intact. 4+/5 strength left lower extremity (per patient and wife, this is chronic), 5/5 strength remainder of extremities. 2+ patellar reflexes bilaterally, 1+ achilles reflexes bilaterally. Decreased sensation with vibration and monofilament testing bilateral feet to ankles. Coordination intact. No cogwheeling or rigidity.
- Extremities: Chronic venous stasis changes with woody induration. 1 mm pitting edema bilateral lower extremities to mid-shin.
- Skin: Scattered solar lentigo bilateral arms and face. Several old bruises on shins and arms.

Cognitive Evaluation:

- Montreal Cognitive Assessment (MoCA): 17/30 (missed trails B, cube, and clock (0/5); 2/3 on serial 100 s; 1/5 on delayed recall; missed 1 on abstraction and 2 on orientation)
- PHQ-2: 0 points

Gait/Balance Assessment:

- Get Up and Go: Used arms to push out of chair; walked slowly with use of walker with a deliberate, narrow gait. Unsteadiness on turn. Returned slowly to chair and used arms to return to seated position. Some pursed lip breathing at the end of this. The total time it took for him to walk 10 feet and back was approximately 30 seconds.
- Static Balance Tests: No difficulty with feet together. Unable to hold semi-tandem for more than a second. Unable to place feet in proper position for full tandem.

Case 2

Mrs. Smith is a 75-year-old female who presents to establish care. She has no symptoms or concerns.

Past Medical History:
- Hypertension
- Hypothyroidism

Osteoporosis Medications:
- Amlodipine
- Levothyroxine
- Alendronate

Social History:
She has been living alone since her husband of 47 years passed away last year. Before he passed away, she was his primary caregiver. She continues to pay her own bills, does her own grocery shopping, and does not require help with any Instrumental Activities of Daily Living or Activities of Daily Living, "I've always been independent." Enjoys organizing and leading discussions at her book club and going on 2-mile walks with friends several times a week.
- Never smoker.
- One glass of wine at book club, weekly.

Physical Exam:
- Vitals: BP 121/74, HR 72, afebrile, weight 135 lbs, height 5′5,″ BMI 22.5
- General: Well-developed female, appearing younger than stated age
- Eyes: Pupils equal and reactive
- HENT: Thinning hair. Well-fitting dentures in place
- Cardiovascular: Regular rate and rhythm. No extra heart sounds. 2+ symmetrical radial and posterior tibialis pulses
- Pulmonary: Comfortably breathing on room air. Clear to auscultation bilaterally
- Abdomen: Soft, nontender
- Neurologic: Cranial nerves II–XII intact. 5/5 strength bilateral upper and lower extremities. Sensation intact to light touch and vibration throughout
- Skin: Several seborrheic keratoses on arms

Cognitive Evaluation:
- Montreal Cognitive Assessment (MoCA): 27/30 (4/5 delayed recall)
- PHQ-2: 0 points

Gait/Balance Assessment:
- Get Up and Go: Able to rise from chair without use of side arms and it takes her approximately 15 seconds to walk 10 feet, turn, and return to her chair.
- Static Balance Tests: No difficulty with semi-tandem and feet together. Lost balance with full tandem after 5 seconds. Normal for her age.

Considerable uncertainty exists on when and how to screen older adults for diseases such as cancer, cardiovascular disease, and diabetes. In part, this is because the oldest and the sickest patients are often excluded from the studies that provide the evidence-base for screening guidelines. For example, there is a paucity of randomized controlled trial data to guide cancer screening in adults older than 75 years of age [1].

Age-based screening guidelines provide thresholds for screening a geriatrics population with the goal of maximizing benefit over harm. For example, because after age 75, the older adult is generally less likely to benefit from cancer screening, harm from screening may outweigh potential benefit. While age-based guidelines hold value, these guidelines are based on the *average* life expectancy for a given age, that is, they rest on the assumption that two older adults age 76 years old will each live the same number of years before they die. As exemplified by the two patients we will discuss, there is significant heterogeneity in life expectancy for older adults.

A patient's life expectancy matters for decisions about whether to screen for a disease because if the patient is not likely to live long enough to die from the disease, then he or she will not benefit from a screening program. For example, a frail older adult whose life expectancy is shortened by other comorbidities and declining functional status may be more likely to die *with* that colon cancer than *from* that colon cancer. Furthermore, screening tests carry potential harm such as complications from the screening procedure. Clinicians should individualize decisions about screening taking into account the heterogeneity among older adults of the same age and patient preferences.

Using cancer screening as a paradigm, this chapter suggests a five-step person-centered framework for screening decisions for older adults:

1. **Recognize the heterogeneity of aging and factors that influence life expectancy.**
2. **Identify the current societal screening guidelines for older adults and their differences.**
3. **Understand characteristics of screening tests, such as lagtime to benefit, potential immediate harms, and screening biases.**
4. **Elicit patients' preferences and values to guide shared decision-making.**
5. **Consider a patient's predicted life expectancy, likelihood to benefit accounting for test characteristics, and patient preferences when making individualized screening decisions in older adults.**

1. Recognize the heterogeneity of aging and factors that influence life expectancy.

"Heterogeneity of aging" refers to the broad range of "phenotypes" among older adults. Multiple studies have examined how the following factors may help account for the large variation in disease and disability that is seen in older adults of the same age group [2]. These factors include:
- Environment
- Childhood diseases
- Health behaviors
- Genetic links

Considering the multitude of factors that influence how we age, it may be less surprising how much life expectancy can vary for patients in the same age group. When median life expectancies are stratified by quartile (see Fig. 28.1), the heterogeneity of aging and life expectancy is readily apparent [1].

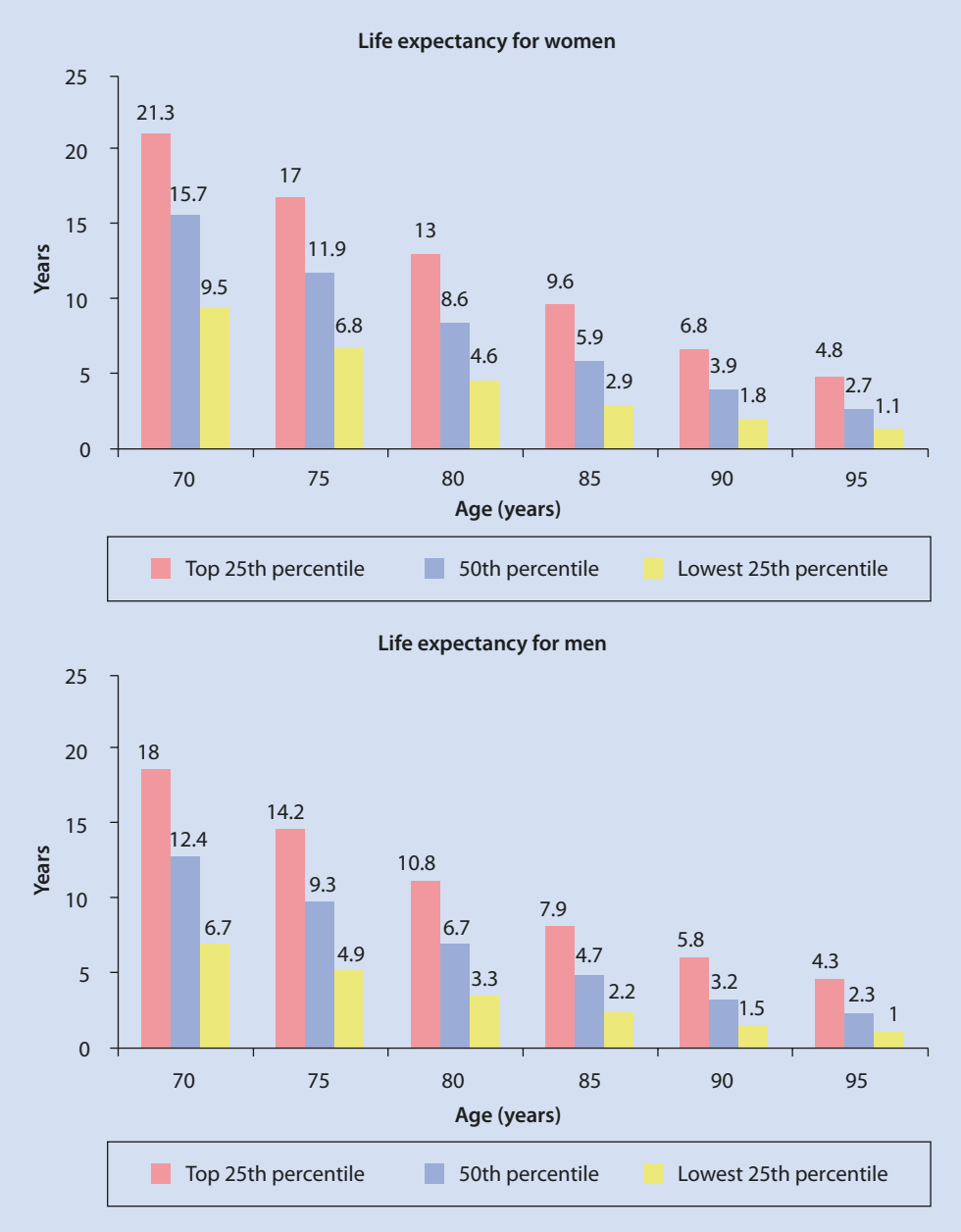


Fig. 28.1 Median life expectancy by quartile of overall health status

28.2.1 Factors That Influence Life Expectancy

Evidence suggests that many factors other than age exert a strong influence on a patient's life expectancy. Such factors include:

- Sex (females live longer)
- Physical function
- Cognitive function
- Comorbid medical conditions (i.e., congestive heart failure, cancer, COPD, diabetes)
- Ethnicity
- Socioeconomic status
- Environmental factors (i.e., diet, exercise, pollution)
- Genetics

28.2.2 No One Has a "Crystal Ball" (and Not All Patients Want One)

A prognosis is a predication about what is most likely to happen to a patient in the future, and the science of prognostication is early in its development. While this chapter provides examples of tools that can help clinicians make predictions about a patient's life expectancy, it is important to remember that these predictions are only probabilities. For example, it would be inappropriate to tell Mrs. Smith, "I have great news, you will live to 92 years old!" A more adept communication would be to tell Mrs. Smith, "It is my assessment than you are in excellent health, and patients who are in excellent health often live well into their 90s." Further, for a variety of personal or cultural reasons, some older adults prefer not to dis-

cuss their life expectancy, though studies suggest that many do and the vast majority would like to at least be provided the option to discuss it.

28.2.3 Tools to Improve Prediction of Life Expectancy

Inherent uncertainty of prognostication aside, studies suggest that combining clinical judgment with evidence-based prognostic tools results in more accurate predictions than either alone [3].

Examples of evidence-based prognostic resources include:

- Actuarial tables
- Census reports
- Life expectancy tables
- E-prognosis – ► www.eprognosis.org (a compilation of prognostic indices for mortality in older adults with multiple comorbidities)
- Palliative Performance Index (for patients of any age with a terminal cancer)
- Literature that explores mortality rates on the basis of health status

Before using any tool to make a prediction for a patient, it is important to consider whether it was studied in a population that included people similar to your patient, as well as how accurately the tool has performed when tested in other populations [3].

(a) **Life Expectancy Tables Stratified by Overall Health**

Life expectancy graphs provide a general idea of the distribution of median life expectancies for a given sex and age. Clinicians can stratify patients into life expectancy quartiles based on their clinical judgment of whether that patient's health status is above (75th percentile), at (50th percentile), or below average (25th percentile) for their age and sex [1].

Case Application of Lifetable Graphs by Overall Health Status to Predict Life Expectancy for Mr. Jones and Mrs. Smith

For example, a clinician might consider Mr. Jones to be in the lowest quartile due to his functional problems such as needing help with showers, transfers, medications, and other instrumental activities of daily living. He also has multiple medical problems including coronary artery disease, ischemic cardiomyopathy, diabetes, and history of stroke. Using the lifetables graphs, his life expectancy is an estimated 4.9 years (75-year-old male, lowest quartile).

In contrast, Mrs. Smith might be considered in the highest quartile as she is quite functional and has minimal comorbidity. Using the lifetables graphs, her life expectancy is an estimated 17 years (75-year-old female, highest quartile).

In this case example, despite both individuals being the same age, differences in sex and our estimate of quartile ranking based on health status suggest a significantly different life expectancy.

(b) **Life Expectancy Tables Stratified by Functional Status**

After age and sex, function is the strongest predictor of life expectancy [1]. Estimating quartiles can be difficult, so some clinicians stratify patients based on function. One study even used epidemiological data to create life expectancy tables organized into three functional groups associated with different life expectancies:

- Independent
- Mobility Disabled (inability to walk half a mile and/or walk up and down a flight of stairs without help)
- ADL Disabled (needing help with bathing, transferring, dressing, eating, or using the toilet) (See ◘ Fig. 28.2)

Case Application of Lifetable Graphs by Function to Predict Life Expectancy for Mr. Jones and Mrs. Smith

Using life expectancy tables based on that study (see ◘ Fig. 28.1, Functional Status Lifetable Graph), Mr. Jones is considered ADL disabled and would therefore be in the lowest quartile of life expectancy for his age group (4 years). In contrast, Mrs. Smith is considered independent, and would therefore be in the highest quartile of life expectancy for her age group (13 years).

Women	Life expectancy (years)		
Age	Independent	Mobility disabled	ADL disabled
70	16.7	15.7	11.5
75	13.2	12	8.2
80	10.3	9	6
85	8	6.9	4.6

Men	Life expectancy (years)		
Age	Independent	Mobility disabled	ADL disabled
70	12.1	10.7	6.5
75	9.4	7.9	4.4
80	7.2	5.7	3.1
85	5.8	4.4	2.3

◘ **Fig. 28.2** Median life expectancy by quartile of overall functional status. (Data extrapolated from Table 1 of Keeler et al. [20])

(c) Prognostic Indices

A prognostic index is a clinical tool that quantifies the contributions that various components of the history, physical exam, and labs make toward a diagnosis, prognosis, or likely response to treatment. In the example of a prognostic index provided in (◘ Fig. 28.3) [1], answering 11 questions (e.g., history of diabetes, difficulty walking several blocks) about Mr. Jones will generate a prediction of his mortality risk within the next 5 years (69%) and 9 years (92%). A compilation of prognostic indices and a guide to interpreting and communicating their results can be found at ► www.eprognosis.org.

2. **Identify the current societal cancer screening guidelines for older adults and their differences.**

Approximately 39.6% of the US population will be diagnosed with cancer at some point during their lifetime [4]. In an effort to promote early detection and decrease mortality, the US Preventive Services Task Force (USPSTF), American Cancer Society (ACS), and other specialty societies have developed cancer screening guidelines. Differences in guidelines exist for various reasons including:

1. *Differences in guideline panel's structure.* Guideline panel members may be comprised of specialists, primary care clinicians, or both. Panels often include other healthcare experts including epidemiologists, public health specialists, or statisticians. The composition of the panel likely influences perspectives through which evidence is interpreted. For example, oncologists, whose clinical practice consists of diagnosed cancer patients and whose

a

l. Age		65–69: 0 points
		70–74: 1 point
		75–79: 3 points
		80–84: 5 points
		85+: 7 points
2. Sex	Female: 0 points	Male: 3 points
3.Weight	BMI: <25	2 points
Height		
703 X (Weight in pounds/height in inches^2)		
Body mass index (BMI) = ____		
4. Would you say your health in general is		Excellent/very good: 0 points
		Fair/poor: 2 points
5. Have you ever been told by a doctor or health professional that you had		
a. Emphysema/chronic bronchitis?		
	No: 0 points	Yes: 2 points
b. A cancer? (do not include skin cancer unless it was melanoma)		
	No: 0 points	Yes: 2 points
c. Diabetes (include borderline diabetes)		
	No: 0 points	Yes: 2 points
6. Because of a physical, mental, or emotional problem, do you need the help of other persons in handling routine needs such as everyday household chores, doing necessary business, shopping, or getting around for other purposes?		
	No: 0 points	Yes: 2 points
7. By yourself, and without using any special equipment, how difficult is it for you to walk a quarter of a mile—about 3 city blocks?		
	a. Not at all difficult: 0 points	
	b. A little difficult to very difficult: 3 points	
	c. Can't do at all/do not do: 3 points	
8. Which best describes your cigarette use?		
a. Never smoked (less than 100 cigarettes in your entire life): 0 points		
b. Former smoker: 1 point		
c. Current smoker (smoke some days or every day): 3 points		
9. During the past 12 months, how many times were you hospitalized overmight?		
	None: 0 points	
	Once: 1 point	
	Twice or more: 3 points	

b

Result based on score:
Your total score is 20

Five and nine year mortality

Points	Risk of 5 years mortality (95% CI)	Risk of 9 years mortality (95% CI)
0 – 1	2% (1 – 3)	7% (4 – 13)
2 – 3	4% (3 – 5)	8% (6 – 11)
4 – 5	6% (5 – 7)	16% (13 – 19)
6 – 7	9% (7 – 10)	26% (23 – 29)
8 – 9	13% (12 – 15)	33% (29 – 37)
10 – 11	23% (20 – 25)	52% (48 – 56)
12 – 13	35% (32 – 38)	58% (53 – 62)
14 – 15	43% (39 – 47)	75% (69 – 80)
16 – 17	59% (54 – 63)	83% (76 – 88)
≥18	69% (63 – 73)	92% (86 – 96)

◘ **Fig. 28.3** (**a**, **b**) Sample prognostic index to predict risk of 5- and 9-year all-cause mortality. (Adapted from: Schonberg et al. [18])

exposure is predominantly to witness the benefits of treatment, may be more likely to be biased toward more aggressive screening guidelines. On the other hand, primary care physicians, who more frequently see patients that screen negative for cancer, may be biased toward more conservative screening guidelines.
2. *Differences in weight assigned to evidence.* For cancer screening, scientific evidence and statistics help describe the continuum of benefit versus harm. However, guidelines are essentially value judgments as to where to set thresholds for recommendations.

As previously discussed, age-based guidelines are complicated for older adults given the relative lack of data in this population as well as the variation in screening benefit versus harm based on life expectancy. The following section reviews the current screening guidelines for asymptomatic patients at average risk for malignancy, highlighting those specific to older adults and taking into account life expectancy.

28.2.4 Breast Cancer

For women 75 years or older, the USPSTF recommendation states that the current evidence is insufficient to assess the balance of benefits and harms of screening mammography [5]. The American Cancer Society (ACS) recommends screening should continue as long as the patient is in good health and expected to live 10 years or longer [7]. The American College of Obstetrics and Gynecology (ACOG) recommends offering annual mammography for patients >40 years of age without specification of age-based thresholds or life expectancy [9].

28.2.5 Cervical Cancer

For women age 65 or older, both the USPSTF and the ACS recommend against screening if there has been prior adequate screening and the last three tests have been normal [5, 7]. Also, patients who have had a total hysterectomy (uterus and cervix removed) for reasons not related to cervical cancer and pre-cancer do not need continued testing. All women who have been vaccinated against HPV should still follow screening recommendations.

28.2.6 Colorectal Cancer

The USPSTF, ACS, and American College of Gastroenterology (ACG) recommend screening for patient ages 50–75 years [7]. There are various screening methods available, which the ACG has grouped into cancer prevention tests and cancer detection tests (Table 28.1) [5, 10]. There should be shared decision-making regarding the type of screening test to pursue, as the data does not clearly demonstrate that any one screening strategy is superior to another. The best test is the one that is most likely to promote patient adherence to screening over time [6]. The guideline emphasizes individualized screening for colorectal cancer in adults aged 76–85 years. Adults in this age group who have never been screened for colorectal cancer are more likely to benefit and should be considered for screening. However, screening is most appropriate for patients who are healthy enough to undergo treatment if cancer is detected, and do not have comorbid conditions that would significantly limit life expectancy [6].

Table 28.1 Cancer prevention and detection tests (if any of the tests other than colonoscopy are positive, need to do colonoscopy) [7]

Cancer prevention tests[a]	Cancer detection tests
Colonoscopy (every 10 years) CT colonography (every 5 years)[b] Flexible sigmoidoscopy (every 5 years) Double-contrast barium enema (every 5 years)	Fecal immunochemical test (FIT) (annual)[c] Guaiac-based fecal occult blood test (FOBT) (annual) Stool DNA test (every 3 years)

[a]Preferred over detection tests per ACG recommendations
[b]Preferred radiographic screening alternative, per ACG recommendations
[c]Preferred cancer detection test, per ACG recommendations

28.2.7 Lung Cancer

The USPSTF recommends annual low-dose computed tomography (LDCT) for all adults 55–80 years of age who have a 30 pack-year smoking history and currently smoke or quit within the last 15 years. Screening should be discontinued once a person has not smoked for 15 years or develops a health problem that substantially limits life expectancy or the ability or willingness to have curative lung surgery [5]. The ACS recommends screening for annual LDCT for patient aged 55–74 years of age who are in good health [7].

28.2.8 Prostate Cancer

The USPSTF recommends against prostate-specific antigen (PSA)-based screening for prostate cancer for men 70 years and older [5]. The ACS recommends shared decision-making for PSA testing starting at 50 years of age [7]. The American Urological Association (AUA) recommends shared decision-making with annual PSA for patients 55–69 years of age. They do not recommend screening in patients ≥70 years old or with less than a 10–15 year life expectancy [11] (Table 28.2).

Table 28.2 Societal recommendations for cancer screening specific to older adults

	US Preventive Services Task Force (USPSTF)	American Cancer Society (ACS) [4]	Specialty Societies
Colorectal cancer	>75 years old: stop screening if life expectancy <10 years		
Lung cancer	55–80 years old with 30 pack-year history and quit in the last 15 years: annual LDCT		
Breast cancer	≥75 years old: likely little benefit to continued screening if life expectancy <10 years	≥55 years: biennial mammograms, but may also opt to continue annually. Continue screening until life expectancy <10 years	
Cervical cancer	≥65 years old with three consecutive negative pap or two consecutive negative pap with contesting within the past 10 years, with most recent test performed 5 years ago: no further screening Hysterectomy with removal of cervix and no history of precancerous lesion: no further screening		
Prostate cancer	PSA testing not recommended	≥50 years old: shared decision-making. Recommend against screening if life expectancy <10 years	55–69 years old: shared decision-making ≥70 years old: stop screening if life expectancy <10–15 years

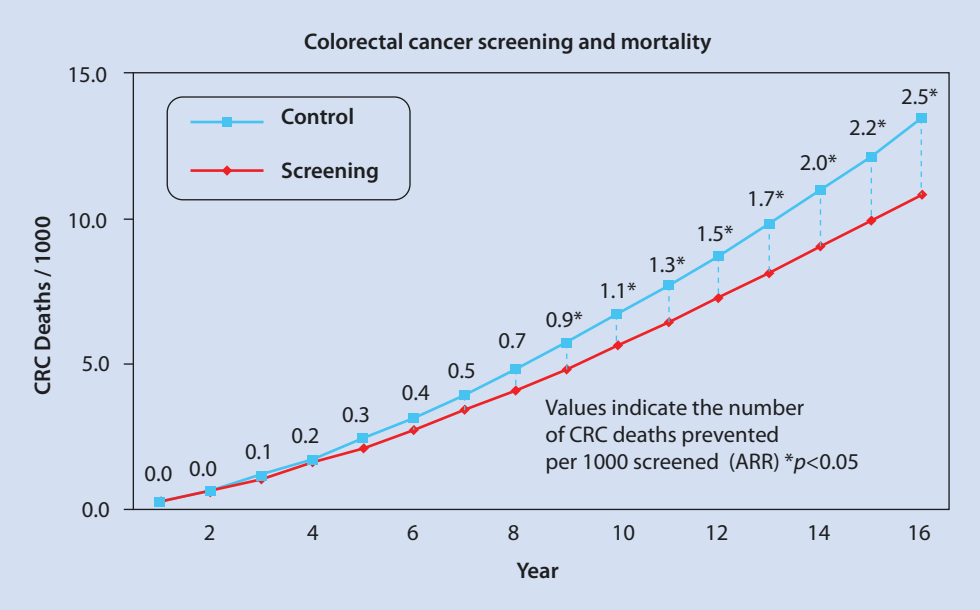


Fig. 28.4 Lagtime to benefit for colorectal cancer screening. (Data extrapolated from Lee et al. [13])

3. **Understand characteristics of screening tests, such as lagtime to benefit, principles of screening, and screening biases.**

"Lagtime to benefit" is defined as the time between the preventive intervention and the time when improved health outcomes are seen [12]. Harm and complications are most likely to occur during the preventive intervention time and benefit is most likely to occur over time. Screening tests differ in lagtime to benefit. For example, studies suggest that on average it takes over 10 years for 1 death from colorectal cancer to be prevented for every 1000 patients screened [13] (see Fig. 28.4). If it generally takes 10 years to benefit from colorectal cancer screening, then harm would likely exceed benefit for an individual with a predicted life expectancy of less than 5 years. Additionally, factors associated with limited life expectancy are also risk factors for complications from interventions, further increasing the risk of harm versus benefit.

Assessing an older patient's life expectancy together with lagtime to benefit may help clinicians identify which patients are more likely to benefit from screening and which patients are more likely to be harmed. The following algorithm has been suggested by experts [12]:

1. Estimate the patient's life expectancy (LE)
2. Estimate the preventive intervention's lagtime to benefit (LtB)
3. (a) If LE >> LtB, the intervention may help and should generally be recommended.
   (b) If LE << LtB, the intervention is more likely to harm and generally should not be recommended.

(c) If LE ~ LtB, the benefits versus harms of the preventive intervention are a "close call" and patient preferences (e.g., the degree of importance placed on the potential benefits and harms) should play the dominant role in decision-making.

While life expectancy and lagtime to benefit are the most important considerations when making screening decisions on an *individual level*, it is also important to understand screening characteristics for *population-based screening strategies*. Fundamental principles of screening include:

(A) *Considerations about the disease for which to be screened*
1. The disease must have an asymptomatic state and progress to a symptomatic state.
2. The disease must be sufficiently prevalent in the population.
3. The disease must cause significant morbidity and mortality.
4. Treatments must be available that will beneficially affect morbidity and mortality.

(B) *Considerations about the tests for the disease*
1. The screening test must be a good test (e.g., sensitivity/specificity, PPV/NPV).
2. The evaluation of the screening program must avoid the common significant biases.
3. The screening test must be cost-effective.

(C) *Considerations about the patient(s) to be screened*
1. The screening test must be acceptable to the patient.
2. The patient must have sufficient life expectancy to derive benefit from the potential life gained by the screening program.

Fundamental principles of screening apply to all populations but certain elements may need special considerations in a geriatrics population. For example, many diseases have a higher prevalence in older adults and can cause significant mortality. However, treatments that beneficially affect morbidity and mortality in the general population may not be beneficial in a population with limited life expectancy. Further, while a screening test may be an accurate test in terms of sensitivity and specificity, it may detect disease that is inconsequential to some populations or give a false sense of increased survival based on potential screening biases.

28.2.9 Screening Biases

28.2.9.1 Overdiagnosis Bias

Overdiagnosis can occur when there is an overestimation of screen-detected cases due to the inclusion of pseudodisease, subclinical disease, or slow growing disease that would not become overt before the patient dies of other causes.

Example: A 76-year-old woman has breast cancer that is unknown to her as she has no symptoms. She may choose to discontinue breast cancer screening, the breast cancer is never diagnosed, and she dies of a heart attack at age 80. She may choose to undergo breast cancer screening, the cancer is diagnosed, she recieves surgery and radiotherapy, and she dies of a heart attack at age 80. This is an example of overdiagnosis bias detected by screening, and treatment ultimately may not have affected her survival.

28.2.9.2 Lead Time Bias

Lead time bias can occur when screening finds an asymptomatic cancer earlier than that cancer would normally have been diagnosed, but the earlier diagnosis does nothing to change the overall disease course or patient mortality. The earlier diagnosis provides the appearance that the screening intervention lead to longer survival, but in actuality, the longer survival was due to the disease being identified earlier.

Example: Two 72-year-old gentlemen with a history of tobacco use have lung cancer. Neither have symptoms. The first patient is diagnosed with lung cancer by a screening test at age 75. He receives treatment and lives up to 80 years old, hence a survival after cancer diagnosis of 5 years. The second patient does not undergo screening, but develops symptoms from lung cancer at age 77 and is diagnosed at that time. He also receives treatment and lives up to 80 years old. However, his survival after cancer diagnosis is only 3 years. Despite both men living to the same age, the screened individual appears to have a longer survival. This is an example of lead time bias (see ◘ Fig. 28.5).

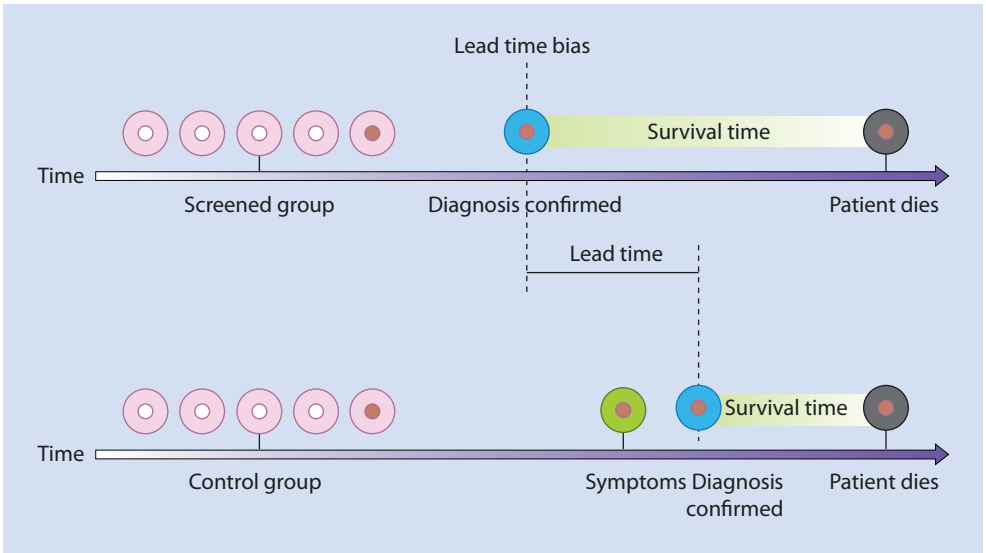
4. **Elicit patients' preferences and values to guide shared decision-making.**

Eliciting patient preferences and values is a key component of shared decision-making. One suggested approach to eliciting these values is a shared discussion about short- and long-term goals. Short-term goals prioritize immediate symptom control and health needs, which may become the only focus for patients with limited life expectancy. Long-term goals include chronic disease management, and preventive care and health promotion, and are more likely to be discussed with healthy older adults.

Some examples of introductory open-ended questions to facilitate these discussions are:

- "What are the values that you hold for your medical care?"
- "What is most important to you in life?"
- "What are your thoughts about cancer screening?"
- "Would you tell me about your past experiences with cancer screening?"
- "What do you hope to gain through screening for _____ cancer?"
- "Discussing cancer screening provides us an opportunity to discuss your overall thoughts and preferences for your medical care. It's important to understand what tests and procedures can do for us, and what we would do with the information these tests would provide. Have you thought about your wishes for how you would like your medical care to help you?"

Fig. 28.5 Lead time bias



Shared decision-making usually entails strategies such as ask-tell-ask, in which the clinician (1) asks the patient for his/her understanding about the decision at hand and (2) offers information about the decision such as risks and benefits.

5. **Consider a patient's predicted life expectancy, likelihood to benefit accounting for test characteristics, and patient preferences when making individualized screening decisions in older adults.**

The final step of this framework requires synthesizing all of the information from the previous steps into formulating a final shared decision.

Case Conclusion

Should Mr. Jones and Mrs. Smith be screened for colon cancer?
Final Discussion with Patients:
Clinician: "What do you hope to gain through cancer screening?"
Mr. Jones: "I've got too much on my plate right now to think about another test. I'd love to focus on getting my energy back and getting off some of these medications if possible."
Mrs. Smith: "I want as much time around as possible, I hope to see my grandchildren get married. I don't mind more tests and procedures."

For Mr. Jones, taking into account predicted life expectancy (4–5 years), likelihood to benefit (lagtime to benefit 10 years), and patient preferences, a shared decision with Mr. Jones would likely result in stopping colon cancer screening at this time.

In contrast, a shared decision with Mrs. Smith would likely result in continuing screening given her predicted life expectancy (13–17 years), likelihood to benefit (lagtime to benefit 10 years), and patient preferences.

The decision-making process for these two patients, of the same age but with different health status and goals of care, illustrates how screening decisions in older adults require individualization. This framework can be applied to many other preventive care measures for older adults.

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