Preoperative Assessment in Older Adults: A Comprehensive Approach

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Surgical outcomes are significantly influenced by patients’ overall health, function, and life expectancy. A comprehensive geriatric preoperative assessment of older adults requires expanding beyond an organ-based or disease-based assessment. At a preoperative visit, it is important to establish the patient’s goals and preferences, and to determine whether the risks and benefits of surgery match these goals and preferences. These discussions should cover the possibility of resuscitation and ventilator support, prolonged rehabilitation, and loss of independence. The assessment should include evaluation of medical comorbidities, cognitive function, decision-making capacity, functional status, fall risk, frailty, nutritional status, and potentially inappropriate medication use. Problems identified in any of these key areas are associated with an increased risk of postoperative complications, institutionalization, functional decline, and, in some cases, mortality. If a patient elects to proceed with surgery, the risks should be communicated to surgical teams to allow for inpatient interventions that lower the risk of postoperative complications and functional decline, such as early mobilization and limiting medications that can cause delirium. Alcohol abuse and smoking are associated with increased rates of postoperative complications, and physicians should discuss cessation with patients before surgery. Physicians should also assess patients’ social support systems because they are a critical component of discharge planning in this population and have been shown to predict 30-day postoperative morbidity. (Am Fam Physician. 2018;98(4):214-220. Copyright © 2018 American Academy of Family Physicians.)

Nearly 5 million major operations are performed annually in the United States in patients 65 years and older, and older adults undergo operating room procedures at two to three times the rate of younger age groups. The demand for surgical services is projected to increase as the population ages. Although advances in care have decreased surgical risks, older adults experience disproportionate levels of postoperative morbidity and mortality. Conducting a geriatric preoperative assessment involves eliciting patients’ goals and priorities in the context of their overall health and likely surgical outcomes, and considering whether the risks and benefits of surgery match these goals. If the benefits appear to outweigh the risks, then the physician should evaluate the patient’s decision-making capacity, cognition, comorbidities, presence of depression and frailty, functional status, fall risk, nutrition, and use of potentially inappropriate medications. These factors can help predict possible postoperative complications and inform recommendations on preoperative optimization and risk reduction. This article summarizes the key components of a comprehensive geriatric preoperative assessment for primary care physicians based on 2012 guidelines.

Decision Making and Goal Setting

Patients with multiple comorbidities and decreased functional status are more vulnerable and experience poorer surgical outcomes. Additionally, patients often overestimate the benefits and underestimate the risks of interventions and treatment. Surgery in high-risk patients may shorten a limited life expectancy or negatively impact functional status or quality of life. Primary care physicians can help patients determine goals and preferences before surgery.

ESTABLISHING PATIENT GOALS AND PRIORITIES

One approach to establishing goals is to discuss how patients prioritize longevity, functional status, and comfort. Patients who value living as long as possible over maintaining independence or comfort may be willing to pursue a high-risk surgery, whereas patients who prioritize function and independence may not want to risk surgery that may require prolonged rehabilitation or placement in long-term care.

Physicians should also address patient preferences on resuscitation and ventilator support. Although many surgical procedures require adjusting resuscitation preferences...
at the time of surgery, the discussion should include when
to resume these preferences if patients do not want resus-
citation in the event of significant postoperative compli-
cations.9,10 Patients and their caregivers also may want to
consider the possibility of complications that could affect
functional status or prognosis, and whether the patient
would adjust his or her goals at that point.

ASSESSING RISKS AND BENEFITS OF SURGERY
Risks, benefits, and potential outcomes can be discussed
before making a referral to a surgeon for an elective pro-
cedure, or at the preoperative assessment if input from the
surgeon is needed. Factors to consider include type of sur-
gery, type and risk of anesthesia, recovery time, and alterna-
tives to surgery, which may include palliative care. It is also
important to consider any high-risk medical conditions,11
as well as overall life expectancy, which may be impacted by
dementia or poor functional status. There are several prog-
nostic models available at http://www.ePrognosis.org that
can assist physicians with estimating patients’ prognosis
and life expectancy. If the prognosis is poor, patients may
be less likely to benefit from certain surgical procedures,
and discussing palliative care or hospice may be more
appropriate. If it is determined that surgery is appropriate
based on a patient’s goals and expectations, then the phy-
sician should proceed with a geriatric preoperative assess-
ment (Table 1).12-29

Geriatric Preoperative Assessment
COGNITION
Delirium, dementia, and depression are important consid-
erations when evaluating cognition, because impaired sen-
sorium has been shown to increase the risk of postoperative
complications and mortality.30

Delirium is defined as an acute state of confusion and
inattention, which may be accompanied by an altered level
of consciousness and disorganized thinking. It is associated
with poorer outcomes in the postoperative setting, includ-
ing increased length of hospital stay, pulmonary complica-
tions, in-hospital falls, dehydration, and infections.31 The
risk of developing delirium can be determined by assess-
ring the number of predisposing and precipitating factors
(Table 2).32 Targeting risk factors can reduce the occur-
rence and severity of delirium. For example, physicians can
encourage family members to be at the patient’s bedside,
bring eyeglasses and hearing aids for those with vision or
hearing impairment, and reorient often. Health care teams can promote
early mobilization, early referral to physical and occupational therapy,
adequate nutritional support and pain management, and minimization of
patient tethers (e.g., Foley catheters, intravenous poles, electrocardiogram
cords). The Confusion Assessment Method can help identify delirium
in the perioperative period in high-
risk patients.14 This method involves
identifying key diagnostic criteria of
delirium including (1) acute onset and
fluctuating course, (2) inattention, (3)
disorganized thinking, and (4) altered
level of consciousness. The diagnosis of
delirium using the Confusion Assess-
ment Method requires the presence
of the first two features plus either the
third or fourth feature.

There are many tools to screen for
cognitive impairment, including the
Mini-Cog, a quick screening tool in
the outpatient setting12 (Table 3).33 If
the Mini-Cog screening is positive,
further clinical assessment for demen-
tia is warranted.33

SORT: KEY RECOMMENDATIONS FOR PRACTICE

<table>
<thead>
<tr>
<th>Clinical recommendation</th>
<th>Evidence rating</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Older adults planning to undergo surgery should be assessed for impaired sensorium (delirium, cognitive impairment, or depression).</td>
<td>C</td>
<td>30, 33, 35</td>
</tr>
<tr>
<td>Older adults planning to undergo surgery should be evaluated for functional impairment by asking about activities of daily living and instrumental activities of daily living.</td>
<td>C</td>
<td>4, 20, 33</td>
</tr>
<tr>
<td>Older adults should be screened for fall risk by asking about falls within the past 12 months and difficulty with walking.</td>
<td>B</td>
<td>43, 44</td>
</tr>
<tr>
<td>Patients should be counseled to quit smoking and provided behavioral support to aid in smoking cessation before surgery.</td>
<td>B</td>
<td>54</td>
</tr>
<tr>
<td>Physicians should use a validated tool, such as the updated Beers criteria, to screen for potentially inappropriate medications in older adults during a medication review.</td>
<td>C</td>
<td>28</td>
</tr>
</tbody>
</table>

A = consistent, good-quality patient-oriented evidence; B = inconsistent or limited-quality patient-oriented evidence; C = consensus, disease-oriented evidence, usual practice, expert opinion, or case series. For information about the SORT evidence rating system, go to https://www.aafp.org/afpsort.
Depressive symptoms have also been associated with poor functional recovery and increased likelihood of discharge to a facility posthospitalization. Patients with preoperative depressive symptoms are more likely to develop and experience a longer duration of postoperative delirium. Screening for depression can be done using the Patient Health Questionnaire-2 or the Geriatric Depression Scale (eTable A; http://web.stanford.edu/~yesavage/GDS.html), both of which are brief, validated tools.

**DECISION-MAKING CAPACITY ASSESSMENT**

Assessing decision-making capacity is important, particularly if deficits are found on cognitive testing. Some patients lack capacity for specific periods of time, such as during critical illness, but not permanently. Patients with impaired capacity may still be able to make focused, less risky diagnostic and treatment decisions. The Aid to Capacity Evaluation is a useful tool that focuses on the specific decision the patient is facing and identifies the four elements of capacity: (1) understanding of the proposed treatment, (2) understanding of the risks, benefits, and alternative options, (3) ability to make a choice, and (4) ability to communicate the choice to the physicians.

The Aid to Capacity Evaluation tool can be performed in less than 30 minutes and is available free online.

**TABLE 1**

<table>
<thead>
<tr>
<th>Focal Areas for Comprehensive Geriatric Preoperative Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Domain</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Cognition</td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Function</td>
</tr>
<tr>
<td>Mobility and fall risk</td>
</tr>
<tr>
<td>Frailty</td>
</tr>
<tr>
<td>Nutrition</td>
</tr>
<tr>
<td>Alcohol and tobacco use</td>
</tr>
<tr>
<td>Cardiac evaluation</td>
</tr>
<tr>
<td>Medication review</td>
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<tr>
<td>Family support</td>
</tr>
</tbody>
</table>

**Note:** See a previous AFP article on geriatric assessment at https://www.aafp.org/afp/2018/0615/p776.html. START = screening tool to alert doctors to right treatment; STOPP = screening tool of older persons’ prescriptions.

Information from references 12 through 29.
For patients who lack capacity, a surrogate will need to assist with decision making and informed consent in the perioperative period.

FUNCTIONAL ASSESSMENT

Although many community-dwelling older adults are functionally independent, the percentage who need help performing activities of daily living doubles with each decade of age into the mid 80s. Functional status can be assessed using the Katz Index (eTable B) to assess activities of daily living and the Lawton scale (eTable C) to assess instrumental activities of daily living. Patients with functional impairment are at increased risk for postoperative complications, including functional decline and institutionalization.

Patients with functional deficits in their activities of daily living or difficulty with mobility should be referred to an occupational or physical therapist for further evaluation and preoperative therapy as appropriate. Prehabilitation involving multimodal approaches, including home exercise, nutrition assessment, relaxation techniques, and pain management, has been shown to improve postsurgical functional outcomes.

MOBILITY AND FALLS

Falls are the primary cause of unintentional injury in older adults and a leading cause of death in this population. Mobility limitations are common in older adults and are associated with depression, social isolation, and decreased quality of life. Mobility limitations and falls lead to functional decline, hospitalization, institutionalization, and increased health care costs. In older adults undergoing surgery, a recent history of falls within the past 12 months is associated with increased postoperative complications, discharge to a rehabilitation facility, and high rates of hospital readmission. Fall risk can be assessed with measures such as the Timed Up and Go test. Strategies to reduce fall risk and improve mobility include exercise programs, physical therapy, and reducing medications associated with falls.
Preoperative malnutrition has been shown to predict wound dehiscence, anastomotic leaks, infection, delirium, mortality, and increased length of hospital stay.\(^4\) The Mini-Nutritional Assessment is the preoperative assessment tool with the greatest sensitivity and specificity (http://www.mna-elderly.com/forms/mini/mna_mini_english.pdf).\(^4\) High-risk patients should be referred before elective surgery to a dietitian who can implement a perioperative nutritional supplementation plan.\(^4\)

**ALCOHOL AND TOBACCO USE**

It is important to screen for alcohol use and notify surgical teams of the risk of alcohol withdrawal. Preoperative alcohol abuse and dependence are associated with increased rates of morbidity, postoperative complications, and prolonged hospitalizations.\(^4,50\) The most common screening tool is the CAGE questionnaire.\(^25\) Abstinence from alcohol is recommended four to eight weeks before surgery.\(^53\) Intensive preoperative alcohol cessation interventions, including pharmacologic strategies for relapse prophylaxis and withdrawal symptoms, may significantly reduce postoperative complication rates.\(^51\) Preoperative behavioral interventions may help reduce risky drinking, but their effectiveness and applicability to older adults are not clear.\(^52\)

Similarly, tobacco use among older adults is associated with greater mortality, higher postoperative complication rates, and poorer physical functioning.\(^53\) Preoperative smoking cessation interventions may improve short-term smoking cessation rates and reduce mortality.\(^54\)

**CARDIAC AND PULMONARY RISK**

Cardiac risk evaluation is a central component of the preoperative surgical evaluation. Postoperative myocardial infarction is associated with significantly elevated in-hospital mortality rates. The American College of Cardiology and the American Heart Association have developed a guideline to assist physicians with evaluating cardiac risk before noncardiac surgery.\(^27\) The guideline recommends using preoperative cardiac testing judiciously, avoiding testing before low-risk surgeries, and ordering testing only if the results will change clinical management.

Postoperative pulmonary complications may prolong the hospital stay by one to two weeks and contribute to functional decline and increased morbidity and mortality. Risk factors for pulmonary complications include age older than 60 years, underlying lung disease, functional dependence, current smoking, delirium, weight loss, and surgical factors such as prolonged or emergency surgery, general anesthesia, and neuromuscular blockage.\(^4\)

**MEDICATION REVIEW**

A complete review of a patient’s medications, including over-the-counter medications, vitamins, and herbal supplements, is essential to identify medications that should be continued

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**TABLE 3**

**Mini-Cognitive Assessment Instrument**

<table>
<thead>
<tr>
<th>Number of items correctly recalled</th>
<th>Clock drawing test result</th>
<th>Interpretation of screen for dementia</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Normal</td>
<td>Positive</td>
</tr>
<tr>
<td>0</td>
<td>Abnormal</td>
<td>Positive</td>
</tr>
<tr>
<td>1</td>
<td>Normal</td>
<td>Negative</td>
</tr>
<tr>
<td>1</td>
<td>Abnormal</td>
<td>Positive</td>
</tr>
<tr>
<td>2</td>
<td>Normal</td>
<td>Negative</td>
</tr>
<tr>
<td>2</td>
<td>Abnormal</td>
<td>Positive</td>
</tr>
<tr>
<td>3</td>
<td>Normal</td>
<td>Negative</td>
</tr>
<tr>
<td>3</td>
<td>Abnormal</td>
<td>Negative</td>
</tr>
</tbody>
</table>


These interventions can improve postoperative function, safety, and quality of life.\(^46\)

**FRAILT Y**

The physical phenotype of frailty is a clinical syndrome in which three or more of the following criteria are present: unintentional weight loss (10 lb [4.5 kg] in the past year), self-reported exhaustion, weakness (grip strength), slow walking speed, and low physical activity.\(^22\) There are several instruments to assess frailty, but, although comprehensive, they involve performance-based measurements that may be challenging in the outpatient clinic. If frailty is identified and time allows, interventions to reduce frailty before surgery may be tried.\(^47\) There are interventional studies on how best to do this, including vitamin D supplementation, protein supplementation, and exercise programs; however, general use of supplementation to treat frailty remains controversial. Increased levels of frailty may alert anesthesiologists to titrate fluid status and other physiologic parameters more narrowly than usual in the perioperative period.\(^48\)

**NUTRITION**

Preoperative malnutrition has been shown to predict wound dehiscence, anastomotic leaks, infection, delirium, mortality, and increased length of hospital stay.\(^4\) The Mini-Nutritional Assessment is the preoperative assessment tool with the greatest sensitivity and specificity (http://www.mna-elderly.com/forms/mini/mna_mini_english.pdf).\(^4\) High-risk patients should be referred before elective surgery to a dietitian who can implement a perioperative nutritional supplementation plan.\(^4\)
during the perioperative period as well as medications that may cause adverse effects, drug-drug interactions, or withdrawal. A medication review may uncover discrepancies between what patients are actually taking and what is listed on a medication list, and it provides an opportunity to remove medications that may be harmful or ineffective, or lack an indication. In one study, more than 50% of older patients undergoing surgery received a potentially inappropriate medication during their surgical hospitalization, underscoring the need to recognize and reduce potentially inappropriate medications in the perioperative period. There are multiple validated tools to assist in identifying potentially inappropriate medications among older adults, including the updated Beers criteria and the STOPP (screening tool of older persons’ prescriptions) and START (screening tool to alert doctors to right treatment) criteria.

**Transition Planning**

When included in a geriatric preoperative assessment, social support has been shown to predict 30-day postoperative morbidity. The American College of Surgeons/American Geriatrics Society guideline recommends that physicians assess patients’ social support systems, because these are critical components of discharge planning. Primary care physicians should discuss postoperative plans with patients, including planning for recovery time, which may include a rehabilitation facility, home care, or additional support at home. The patient should be counseled about when to call the primary care physician after discharge, such as for medication reconciliation or a postoperative appointment to ensure a safe transition to home.

**Editor’s Note:** For a previous AFP article on geriatric assessment, visit https://www.aafp.org/afp/2018/0615/p776.html. For a previous AFP article on evaluating medical decision-making capacity, visit https://www.aafp.org/afp/2018/0701/p40.html.

**Data Sources:** We performed a literature search using PubMed, the Cochrane Database of Systematic Reviews, evidence-based guidelines from the National Guideline Clearinghouse, the Institute for Clinical Systems Improvement, and the U.S. Preventive Services Task Force. Key words included preoperative care, geriatric assessment, and aged or aged 80 and over. Search dates: September 10, 2017, and February 21, 2018.

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**References**

PREOPERATIVE ASSESSMENT IN OLDER ADULTS


**eTABLE A**

### Geriatric Depression Scale: Short Form

Choose the best answer for how you have felt over the past week:

1. Are you basically satisfied with your life? **Yes/No**
2. Have you dropped many of your activities and interests? **Yes/No**
3. Do you feel that your life is empty? **Yes/No**
4. Do you often get bored? **Yes/No**
5. Are you in good spirits most of the time? **Yes/No**
6. Are you afraid that something bad is going to happen to you? **Yes/No**
7. Do you feel happy most of the time? **Yes/No**
8. Do you often feel helpless? **Yes/No**
9. Do you prefer to stay at home, rather than going out and doing new things? **Yes/No**
10. Do you feel you have more problems with memory than most? **Yes/No**
11. Do you think it is wonderful to be alive now? **Yes/No**
12. Do you feel pretty worthless the way you are now? **Yes/No**
13. Do you feel full of energy? **Yes/No**
14. Do you feel that your situation is hopeless? **Yes/No**
15. Do you think that most people are better off than you are? **Yes/No**

**Note:** Answers in bold indicate depression. Score 1 point for each bolded answer. A score > 5 points is suggestive of depression. A score > 10 points is almost always indicative of depression. A score > 5 points warrants a follow-up comprehensive assessment. Source: [https://web.stanford.edu/~yesavage/GDS.html](https://web.stanford.edu/~yesavage/GDS.html). This scale is in the public domain.
### Katz Index of Independence in Activities of Daily Living

<table>
<thead>
<tr>
<th>Activities</th>
<th>Independence (1 point)*</th>
<th>Dependence (0 points)†</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathing</td>
<td>Bathes self completely or needs help in bathing only a single part of the body, such as the back, genital area, or disabled extremity</td>
<td>Needs help with bathing more than one part of the body, getting in or out of the bathtub or shower; requires total bathing assistance</td>
<td></td>
</tr>
<tr>
<td>Dressing</td>
<td>Gets clothes from closets and drawers, and puts on clothes and outer garments complete with fasteners; may need help tying shoes</td>
<td>Needs help with dressing self or needs to be completely dressed</td>
<td></td>
</tr>
<tr>
<td>Toileting</td>
<td>Goes to toilet, gets on and off, arranges clothes, cleans genital area without help</td>
<td>Needs help transferring to the toilet and cleaning self, or uses bedpan or commode</td>
<td></td>
</tr>
<tr>
<td>Transferring</td>
<td>Moves in and out of bed or chair unassisted; mechanical transfer aids are acceptable</td>
<td>Needs help in moving from bed to chair or requires a complete transfer</td>
<td></td>
</tr>
<tr>
<td>Fecal and urinary continence</td>
<td>Exercises complete self-control over urination and defecation</td>
<td>Is partially or totally incontinent of bowel or bladder</td>
<td></td>
</tr>
<tr>
<td>Feeding</td>
<td>Gets food from plate into mouth without help; preparation of food may be done by another person</td>
<td>Needs partial or total help with feeding or requires parenteral feeding</td>
<td></td>
</tr>
</tbody>
</table>

*—No supervision, direction, or personal assistance.  
†—With supervision, direction, personal assistance, or total care.  
‡—Score of 6 = high (patient is independent); score of 0 = low (patient is very dependent).  

Adapted with permission from Katz S, Downs TD, Cash HR, Grotz RC. Progress in development of the index of ADL. Gerontologist. 1970;10(1):23.
### Lawton Instrumental Activities of Daily Living Scale (Self-Rated Version)

For each question, circle the number of points for the answer that best applies to your situation.

<table>
<thead>
<tr>
<th>Question</th>
<th>Without help</th>
<th>With some help</th>
<th>Completely unable to do the activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Can you use the telephone?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2. Can you get to places that are out of walking distance?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>3. Can you go shopping for groceries?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>4. Can you prepare your own meals?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>5. Can you do your own housework?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>6. Can you do your own handyman work?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>7. Can you do your own laundry?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>8a. Do you use any medications?</td>
<td>1</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>8b. Do you take your own medication?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>8c. If you had to take medication, could you do it?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>9. Can you manage your own money?</td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>

**Note:** Scores have meaning only for a particular patient (e.g., declining scores over time reveal deterioration). Some questions may be patient-specific and can be modified by the interviewer.