# Major Surgery in Older Adults….
# Am I Too Old to be Operated On?

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March 15, 2023

Yale Class of 1965 Lecture Series

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# What are we talking about today….

- **Review of Terminology**
- **3 Patient Cases**
- **Geriatric Surgery in the United States**
  - Our aging society
  - Our research on geriatric surgery
  - Geriatric surgery & the US healthcare system
- **Surgery and You**
  - Questions to ask before surgery (start now!)
- **Questions / Comments / Discussion**

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# What is major surgery?

# Definition of “Major Surgery”

Major surgery is any procedure in an operating room usually requiring the use of general anesthesia for a non-endoscopic, invasive operation.

Requires a surgeon and an anesthesiologist.

Often requires a hospitalization.

Can be open, laparoscopic, or robotic.

Can be planned (“elective”) or unplanned (“non-elective”).

# Key Concept: **Timing of surgery**

## "Elective" surgery is planned surgery

- Time to think, discuss, plan
- Choose your surgeon, your hospital, your surgery date
- Chance to see specialists to prepare and optimize for surgery

## "Non-elective" surgery is unplanned / unexpected surgery

- Something happens, you go to ER, surgery is recommended ASAP
- Very little time to think, discuss, plan
- Can feel rushed, overwhelming, stressful
- Little opportunity for preoperative optimization

# Common Major Surgeries in Older Americans

**Breast Surgery:**

- Partial or total mastectomy

**Cardiac Surgery:**

- Coronary artery bypass graft (CABG)
- Aortic or mitral valve replacement / repair

**Endocrine Surgery**

- Thyroidectomy

**General Surgery:**

- Appendectomy
- Cholecystectomy
- Lysis of adhesions
- Partial colectomy
- Small bowel resection
- Hernia repair (inguinal / femoral / ventral)

**Otolaryngology**

- Head and neck surgery

**Gynecologic Surgery:**

- Hysterectomy

**Spine Surgery:**

- Anterior fusion of cervical spine
- Posterior fusion lumbar spine
- Lumbar laminectomy with decompression

**Orthopedic Surgery:**

- Hip replacement
- Knee replacement
- Shoulder replacement / reconstruction
- Hip fracture surgery
- Femur / tibial fracture surgery

**Urology:**

- Prostatectomy

**Vascular Surgery:**

- Carotid endarterectomy
- Lower extremity revascularization surgery

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# What is functional independence?

# Definition of “functional independence”

Functional independence is the ability to complete essential and other important activities of daily living without the assistance of another person.

Essential: bathing, dressing, transferring, walking

Other: shopping, driving, managing finances,

# Primacy of Functional Independence

Most important outcome among older adults with multiple conditions when faced with tradeoff

- Maintain function: 76%
- Relief of pain or other symptoms: 13%
- Keep alive: 11%

Fried, Arch Intern Med, 2011

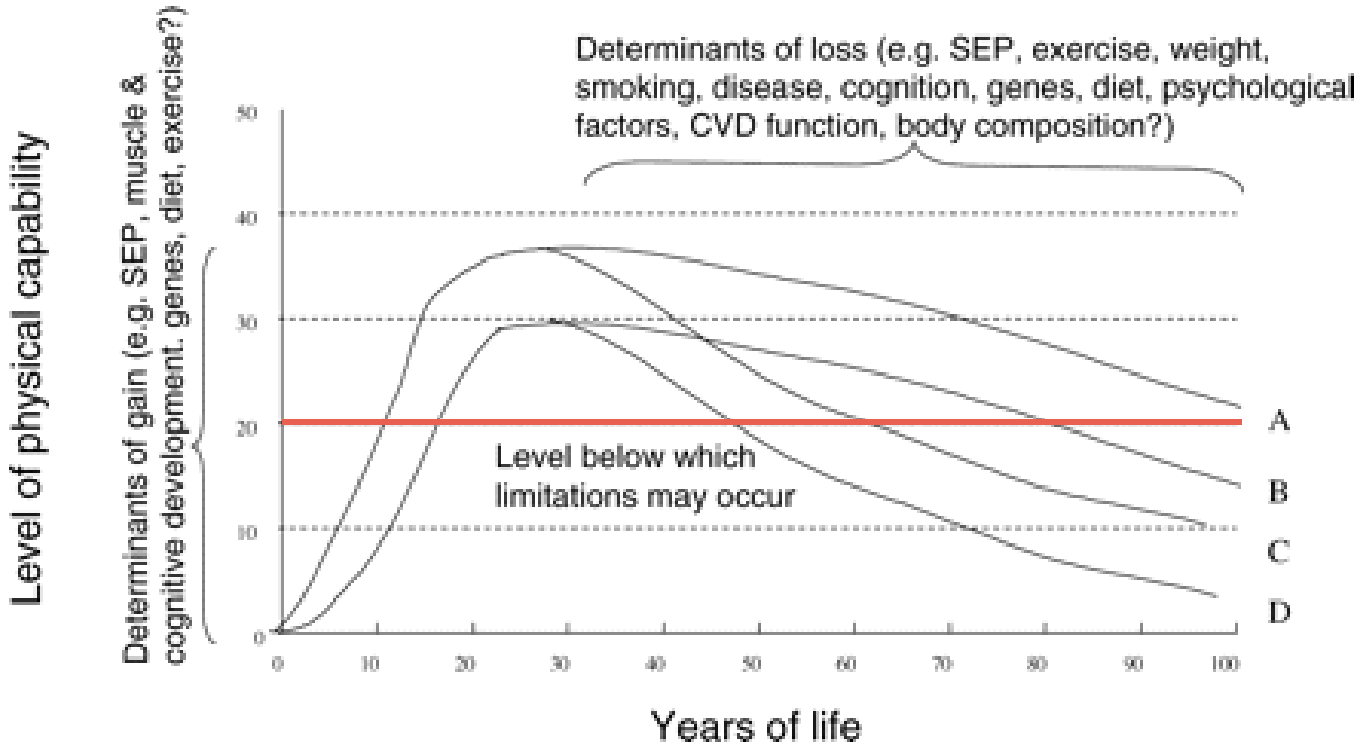
# What is vulnerability?

(from the standpoint of geriatrics & older age)

# Definition of “Geriatric Vulnerability”

Geriatric vulnerability is a state that places older persons at increased risk for adverse outcomes, such as loss of independence and death

# Reserve Capacity Decreases with Advancing Age




Kuh, J Gerontol Med Sci, 2007

What is frailty?

What is dementia?

# Definition of “Frailty”

Frailty is an aging-related syndrome of physiological decline, characterized by marked vulnerability to adverse health outcomes

# Definition of “Dementia”

Dementia is a loss of cognitive functioning – thinking, remembering, and reasoning – to such an extent that it interferes with a person’s day-to-day activities.

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# Patient Case 1

Call from a community hospital ER

80-year-old lady

Left groin pain, nausea / vomiting, and no bowel function for 5 days

Increasingly distended and uncomfortable

On CT scan she had an incarcerated femoral / groin hernia causing a small bowel obstruction

# Patient Case 1

Medical History:

- Otherwise healthy
- Breast cancer s/p partial mastectomy and radiation therapy
- Known groin hernia for >10 years
- Lives alone, widowed, very independent & functionally active
- Very clear about advanced directives, DNR / DNI

Treatment:

- Emergency operation to fix the hernia

# Patient Case 2

Call from the Medical Intensive Care Unit (MICU)

79-year-old lady

Admitted after cardiac arrest with CPR in the field.

In shock on 2 pressors

Abdomen was increasingly distended in the MICU

CT scan showed free air in her abdomen (“pneumoperitoneum”)

# Patient Case 2

Medical History:

- Congestive heart failure, atrial fibrillation on anticoagulation
- COPD, current smoker
- Dementia
- Completely dependent on others, lived with her daughter
- No advanced medical directives, never discussed with family

Bit of a chaotic scene in patient's room

- Multiple family members, but no decision maker
- Disagreement about what the patient would want
- "Do whatever you need to do, Doc."

# Patient Case 2

Treatment:

Did not offer surgery.

Because any operative intervention was highly unlikely to improve the patient's chances to have a meaningful survival.

# Patient Case 3

81-year-old gentleman

History of symptomatic gallstones

Prior episode of acute cholecystitis managed with antibiotics

Complained of “stomach on fire” with the discomfort from his gallstones

Such poor quality of life because of the pain that he did not want to live with the pain any longer

# Patient Case 3

Medical history:

- Stage IV lung cancer, on maintenance chemotherapy
- COPD, active smoker
- Coronary artery disease with prior MI, stents
- Functionally independent, lives on his own

Preoperatively optimized by:

- Medical oncology
- Pulmonary
- Cardiology
- Geriatrics

# Patient Case 3

Treatment:

- Elective laparoscopic cholecystectomy
- Converted to open as it was challenging operation

- Prolonged recovery
- Spent 4 weeks in rehab after discharge from hospital

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# Our aging society….

# Our society is aging

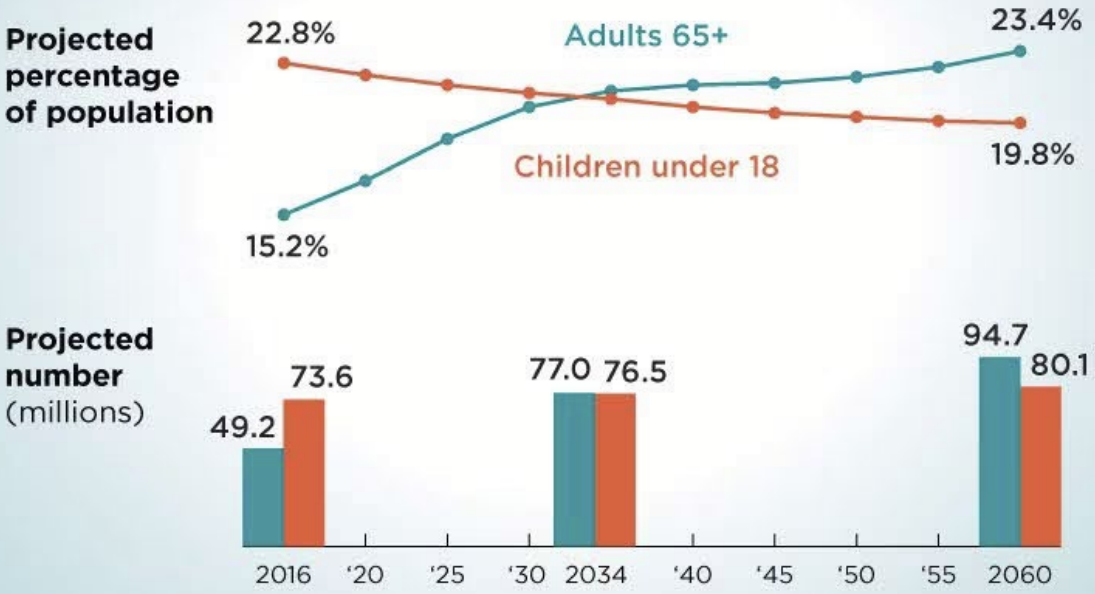
- The number of older persons (≥65 years) is expected to double between now and 2060, from 46 to 98 million.

- This has been called the most significant demographic trend in the history of the United States.

# An Aging Nation

## Projected Number of Children and Older Adults

For the First Time in U.S. History Older Adults Are Projected to Outnumber Children by 2034




Note: 2016 data are estimates not projections.

United States® Census Bureau

U.S. Department of Commerce
U.S. CENSUS BUREAU
*census.gov*

Source: National Population Projections, 2017
www.census.gov/programs-surveys/popproj.html

# Our aging society

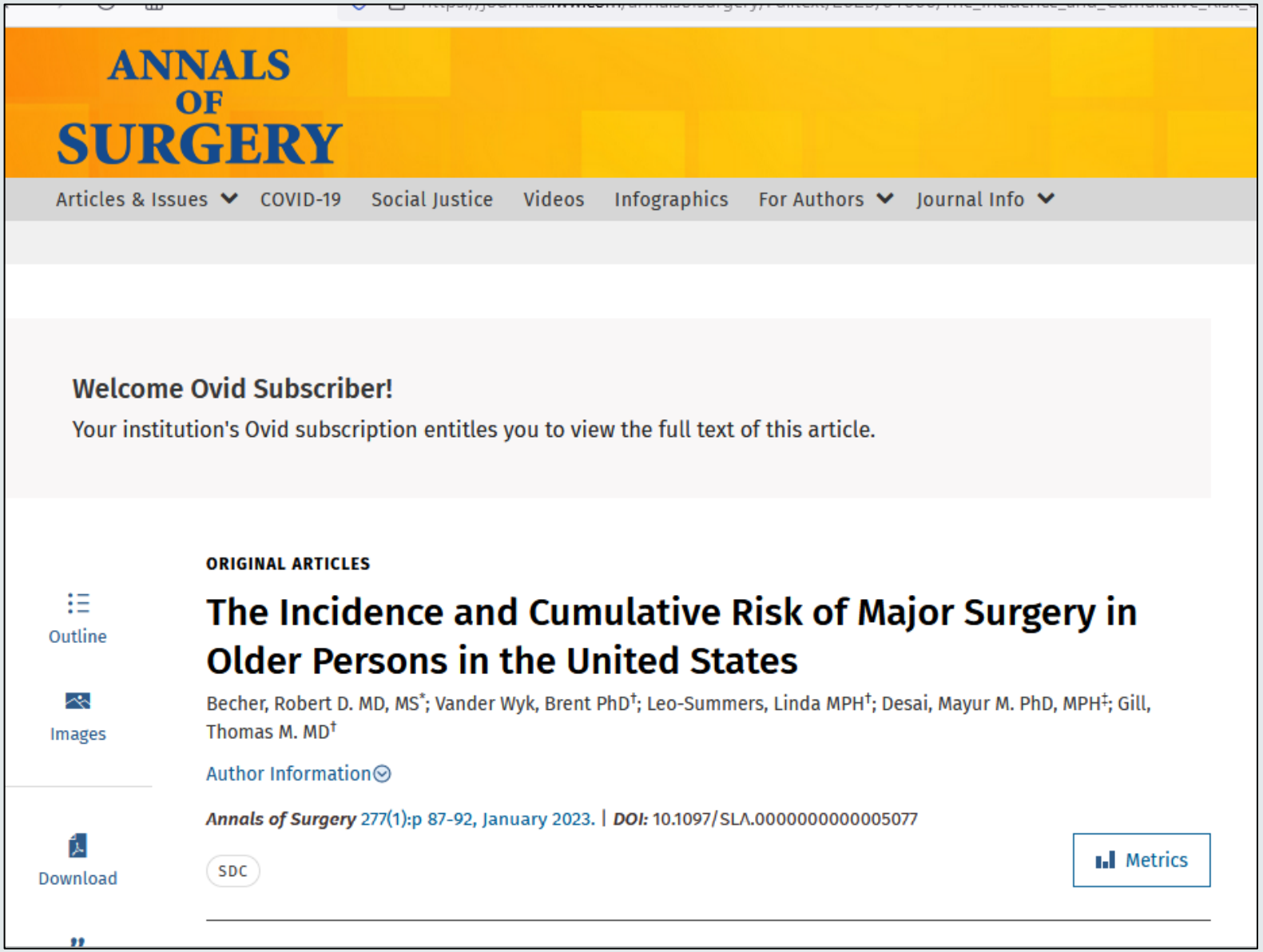
Based on these projections, the number of older persons who will require surgical intervention will increase substantially

It is becoming increasingly imperative to ensure safe and high-quality geriatric surgical care

Despite the demographic imperative, valid and generalizable data on the epidemiology of major surgery in older Americans were lacking.

# Our geriatric surgery research….

# NHATS epidemiology studies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The Incidence and Cumulative Risk of Major Surgery in Older Persons in the United States
Becher, Robert D. MD, MS*; Vander Wyk, Brent PhD†; Leo-Summers, Linda MPH†; Desai, Mayur M. PhD, MPH‡; Gill, Thomas M. MD†
Author Information
Annals of Surgery 277(1):p 87-92, January 2023. | DOI: 10.1097/SLA.0000000000005077
SDC
Metrics

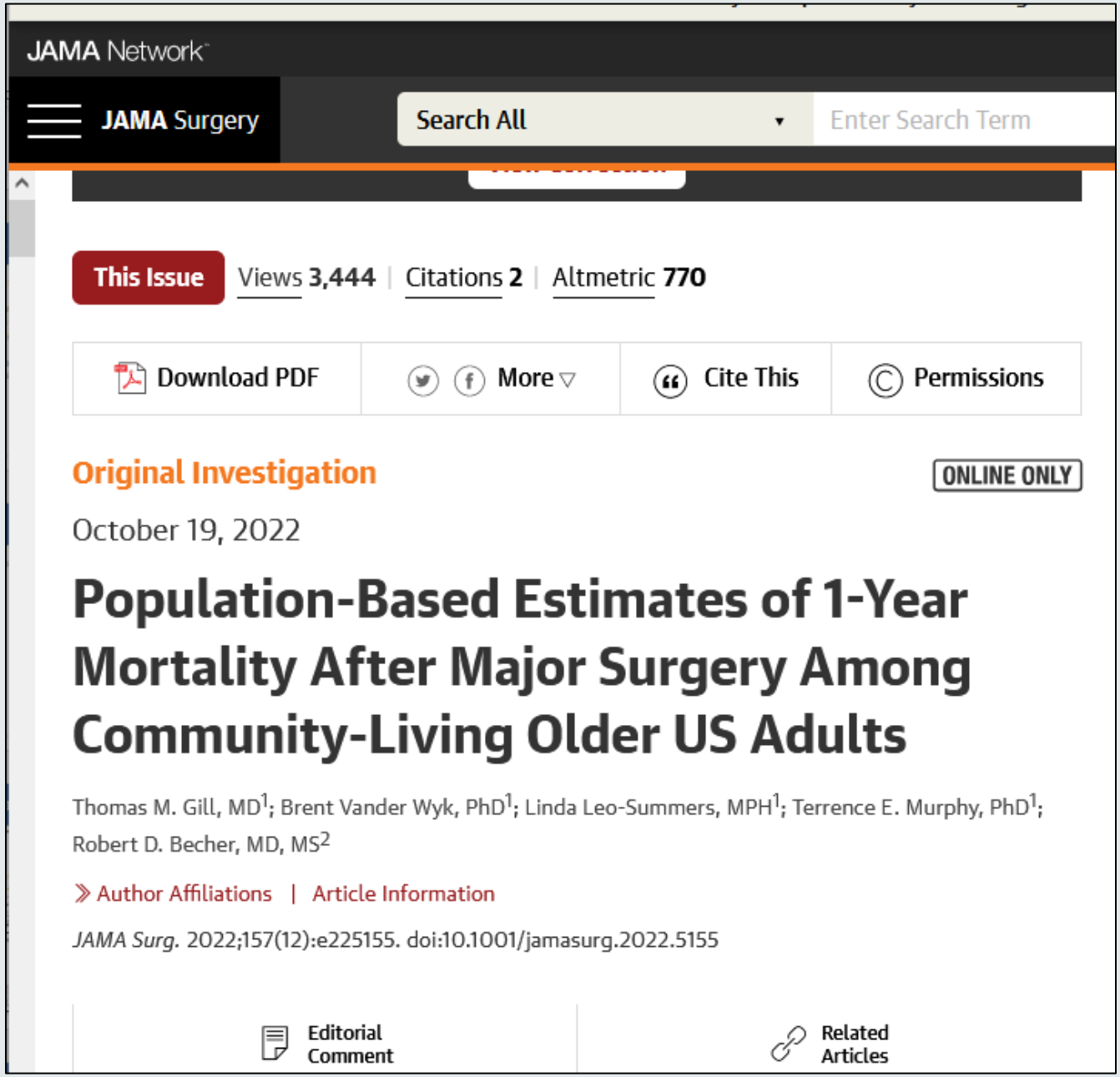
# Incidence and Cumulative Risk Results

The nationally-representative incidence rate of major surgery was 8.8 per 100 person-years

- An average of nearly 9 major surgeries were performed per year for every 100 community-living older persons.
- 2 in 5 major surgeries were non-elective / unplanned.

During the 5-year surveillance window, nearly 5 million unique older persons had at least one major surgery.

- 1 in 7 Medicare beneficiaries.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October 19, 2022
Population-Based Estimates of 1-Year Mortality After Major Surgery Among Community-Living Older US Adults
Thomas M. Gill, MD[1]; Brent Vander Wyk, PhD[1]; Linda Leo-Summers, MPH[1]; Terrence E. Murphy, PhD[1]; Robert D. Becher, MD, MS[2]
Author Affiliations | Article Information
JAMA Surg. 2022;157(12):e225155. doi:10.1001/jamasurg.2022.5155
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# Mortality Results

## 1-year mortality was high after major surgery

*13.4% overall mortality*

1 out of every 7 community-living older Americans will die in the year after major surgery

## Urgency of major surgery greatly impacts 1-year mortality

*7.4% for elective surgery*
*22.3% for non-elective surgery*

For all community-living older Americans, expected 1-year mortality is 4.9%

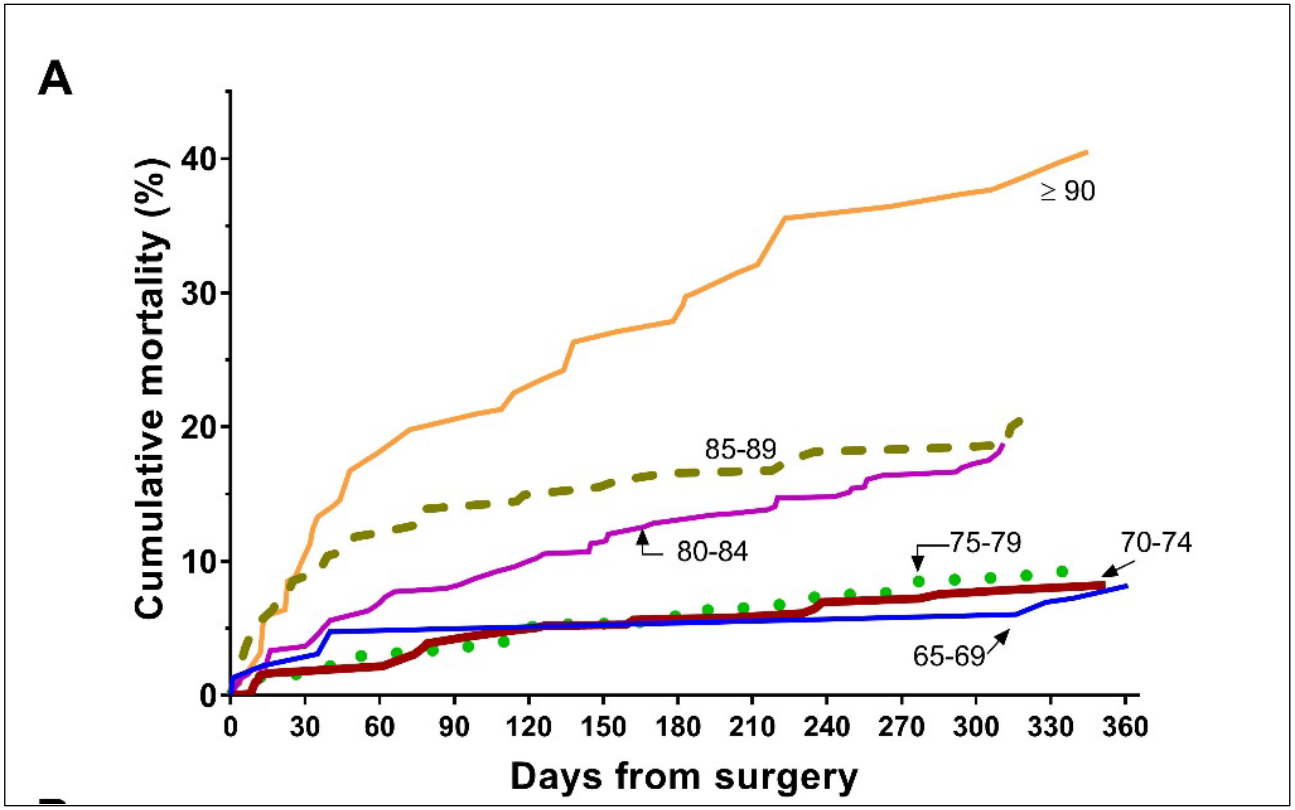
## Frailty and dementia are associated with high 1-year mortality

*27.8% for frailty*
*32.7% for probable dementia*

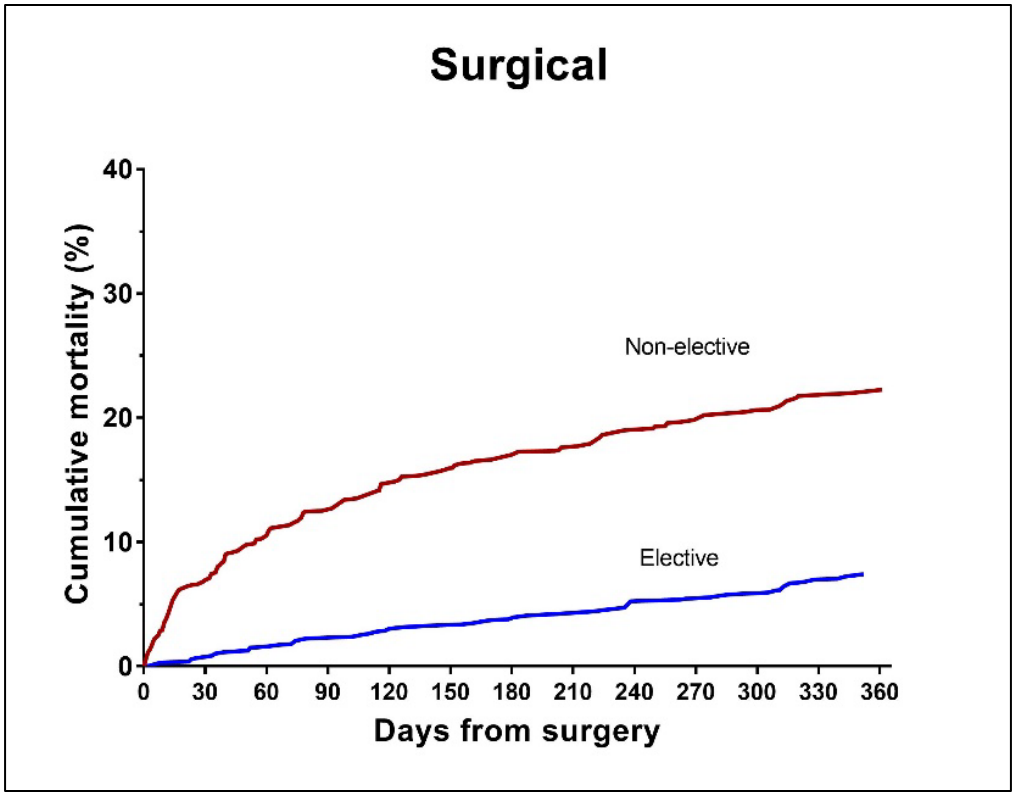
1 of 4 with frailty and 1 of 3 with probable dementia will die in the year after major surgery

Gill, Vander Wyk, Leo-Summers, Murphy, Becher. *JAMA Surg*, 2022

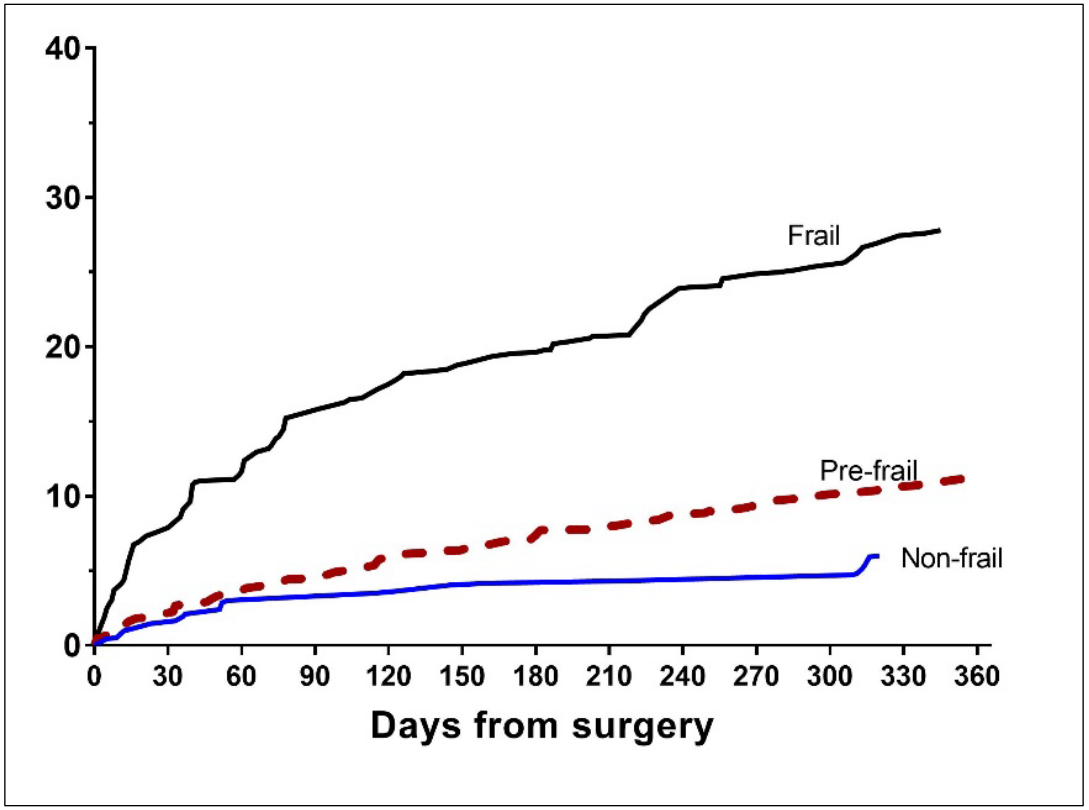
# Mortality by Age



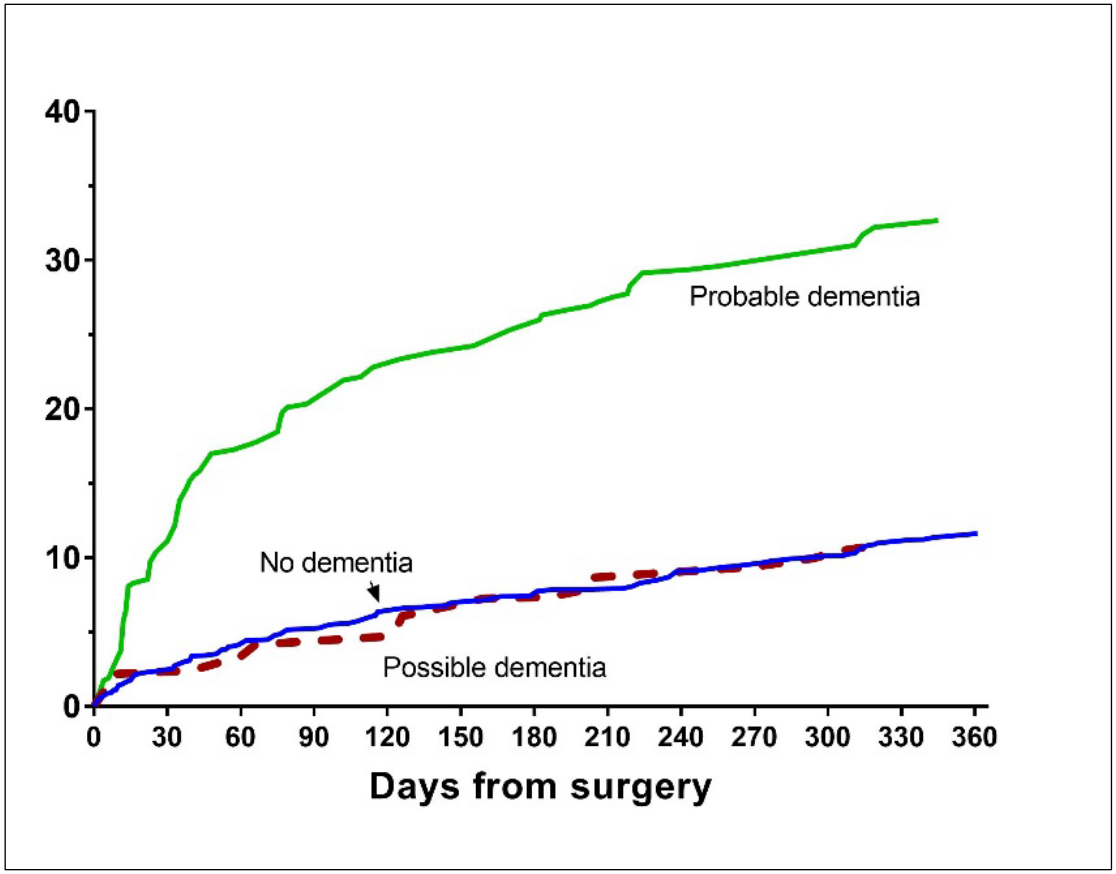
# Mortality by Timing of Operation and Age



# Mortality by Frailty



# Mortality by Dementia



# Key Findings of these 2 studies…

Major surgery is a defining health issue for older Americans

High-risk vulnerable subgroups had amongst the highest incidence rates of, cumulative risks of, and mortality after major surgery

- the oldest-old (≥85 years)
- those undergoing non-elective surgery
- those with frailty
- those with dementia

CNN health | Life, But Better | Fitness | Food | Sleep | Mindfulness | Relationships

# Research helps seniors make informed decisions about risks, benefits of major surgery

By Judith Graham, Kaiser Health News

Published 2:07 PM EST, Fri November 25, 2022

# Geriatric surgery &

# the US healthcare system…

# Why is geriatric surgery so important?

Implications for the US health care system:

- Costs
- Surgeons
- Patient Care

# Costs of geriatric surgery…

The growing number of Medicare beneficiaries requiring major surgery is going to further stress an already expensive Medicare program.

In 2018, Medicare spending was $605 billion:

- 20% of total national health spending
- 15% of the entire federal budget
- 3% of gross domestic product (GDP)
  - Medicare spending is projected to grow to 6% of GDP over next 30 years

Over half of fee-for-service Medicare expenditures are for surgical care

- Continuing to cover all major surgeries will pose fiscal challenges to Medicare.

# Surgeons…

- There will be increased demand for surgeons to operate on older Americans

- The US is already experiencing surgeon / physician shortages
  - 9 out of 10 surgical specialties currently have surgeon shortages
  - Predicted shortfall of up to 28,700 surgeons by 2033
  - Predicted shortfall of up to 139,000 physicians by 2033

- Shortages will adversely affect the ability to perform and provide timely, safe, high-quality geriatric surgery

# Patient Care…

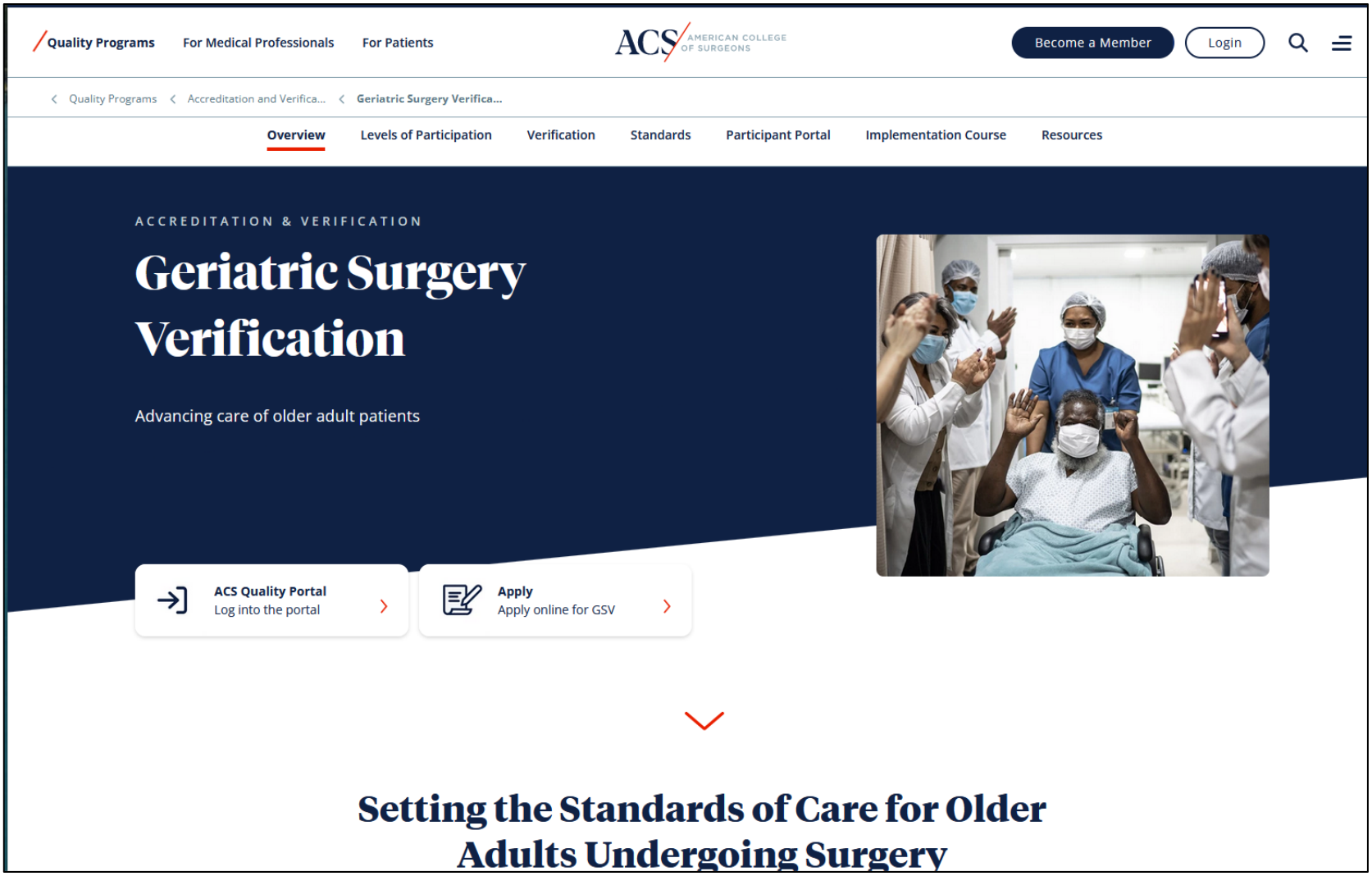
We need more innovative strategies to better address and prioritize the unique needs and wishes of older surgical patients in the perioperative period

- For both elective and non-elective operations
- Examples: guidelines, algorithms, processes of care…

Overall goal is to reduce non-patient-centered, non-beneficial surgical care

- Particularly in the highest-risk vulnerable subgroups

# Geriatric Surgery Care: Next Steps



# PEP studies

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Factors Associated With Functional Recovery Among Older Survivors of Major Surgery
Becher, Robert D. MD, MS*; Murphy, Terrence E. PhD†; Gahbauer, Evelyne A. MD, MPH†; Leo-Summers, Linda MPH†; Stabenau, Hans F. MD, PhD†; Gill, Thomas M. MD†
Author Information
Annals of Surgery 272(1):p 92-98, July 2020. | DOI: 10.1097/SLA.0000000000003233
SDC
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# Key findings…

- After major surgery, nearly 2 of 3 patients recovered to their presurgical level of function by 2 months
  - Meaning 1 of 3 patients never recovered to baseline
- Factors associated with increased likelihood of functional recovery:
  - Being non-frail
  - Having elective/planned surgery
- Factors associated with reduced likelihood of functional recovery:
  - Hearing impairment
  - Greater increase in postsurgical disability in the month after discharge
  - Years of education (hard to explain this)

JOURNAL OF THE AMERICAN GERIATRICS SOCIETY

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Leading Change. Improving Care for Older Adults.

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# Geriatric vulnerability and the burden of disability after major surgery

Thomas M. Gill MD, Terrence E. Murphy PhD, Evelyne A. Gahbauer MD, MPH, Linda Leo-Summers MPH, Robert D. Becher MD, MS

First published: 24 February 2022 | https://doi.org/10.1111/jgs.17693

Yale Links

**Funding information:** The work for this report was funded by a grant from the National Institute on Aging (R01AG017560). The study was conducted at the Yale Claude D. Pepper Older Americans Independence Center (P30AG021342).

# Key findings…

- The burden of disability over the 6 months after major surgery was considerably greater for non-elective than elective surgery

- 10 factors were independently associated with disability burden:
  - ≥85 years of age
  - female sex
  - Black race or Hispanic ethnicity
  - Neighborhood disadvantage
  - Multimorbidity
  - Frailty
  - ≥1 disabilities
  - Low functional self-efficacy
  - Smoking
  - Obesity

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HEALTH

The New York Times

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THE NEW OLD AGE

# The Elderly Are Getting Complex Surgeries. Often It Doesn't End Well.

Complication rates are high among the oldest patients. Now a surgeons' group will propose standards for hospitals operating on the elderly.

Give this article

By Paula Span

June 7, 2019

5 MIN READ

# Think 75 Is Too Old to Have Surgery? Think Again.

## Why more senior adults than ever are having joint replacements, transplants and other major operations.

By **Judy F. Minkove** on 07/11/2018

PUBLISHED IN DOME JULY/AUGUST 2018

James Brantner had always been scrupulous about maintaining his health. He sees his primary care doctor annually, avoids sweets and developed a habit of walking 3.5 miles every other day near his home just outside Harrisburg, Pennsylvania.

So when a routine colonoscopy in 2017 showed evidence of cancer, Brantner, then 76, was stunned. He'd need 12 radiation treatments, followed by surgery to

CNN health Life, But Better Fitness Food Sleep Mindfulness Relationships

# What older Americans need to know before undergoing major surgery

By Judith Graham, Kaiser Health News

Published 5:20 AM EST, Tue December 27, 2022

# Question 1:

**Is the potential operation major surgery or minor surgery?**

This distinction is important, because of the different risk profiles of each. While all surgery has risks, major surgery is riskier in terms of potential complications.

Minor surgery typically does not require general anesthesia (can be done under local often), can be done in a surgery center or outpatient setting, and in general is relatively short and you go home the same day.

Major surgery typically requires general anesthesia, a skin incision, and usually (but not always) a stay in the hospital.

# Question 2:

**Do I have vulnerabilities for poor outcomes after major surgery?**

This is important. We know from our recent *JAMA Surgery* article that people with frailty and dementia, for example, have significantly higher mortality after major surgery.

Therefore, you or your loved ones should be assessed for these vulnerabilities preoperatively, and, if possible, optimized preoperatively.

For example, if you are constantly tired or cannot climb a flight of stairs, you may be frail – and recovery from surgery may be challenging.

# Question 3:

**What is my prognosis with or without the surgery?**

Life expectancy decreases with advancing age but is also dependent on one's underlying medical conditions and other factors such as frailty and dementia.

For elective surgeries, you will want some guidance about whether you will likely live long enough to benefit from the surgery.

# Question 4:

**Has my surgeon communicated with my primary care doctor?**
**Are they on the same page?**

You want to make sure that your primary care doctor and your surgeon agree as to the benefits of surgery.

For example, geriatricians and surgeons think about surgery and patients differently, and getting both perspectives is valuable.

# Question 5:

**Is the major surgery unplanned?**

Unplanned operations are common in older persons (40% of all major surgery).

These surgeries do not allow your surgeon or internist or anesthesiologist or any other health care provider involved in your care to optimize your health and medical conditions before surgery. This is one reason why unplanned operations have higher risks of mortality and complications.

You should be aware of this so that you have realistic expectations of your outcome from unplanned/non-elective surgery.

# Question 6:

**What is the goal of this surgery? How much better will it make me?**
**Is the goal of the surgery in line with my own health goals?**

This is an essential part of preparing for surgery: knowing what you think is a good outcome from the surgery. And then finding out how realistic that goal is.

For example, if you have a large hernia that causes you no discomfort, then you may be able to live with that hernia when you realize that one of the major complications of hernia surgery is constant pain postoperatively. In other words, if the goal of the surgery is to minimize your risk of getting an incarcerated hernia, but the potential cost to you is constant pain – this may not be a tradeoff that is in line with your health care goals.

# Question 7:

**What should I anticipate after major surgery?**

In many cases, older persons are unable to return directly home after having major surgery, especially if they are frail and/or have cognitive problems.

The recovery process could be protracted and require a long stay in a nursing facility for rehabilitation, followed by a period of home services.

You should ask your primary doctor and/or surgeon about the likelihood of having a meaningful recovery.

# Question 8:

**Who will make health care decisions for me if I cannot make them for myself?**

Most major surgery in older Americans goes well, without any complications. But sometimes patients suffer complications from surgery. And rarely, these complications can mean that the patient cannot make decisions for themselves.

Knowing this in advance is important so that patients can identify a partner, loved one, or friend who can put themselves in the patient's shoes and make medical decisions in line with their wishes.

Having a medical proxy is very important.

We want to thank you for the invitation

# Questions / Comments / Discussion