

Surgical Care of the Geriatric Patient – What Every Surgeon Should Know

Tom Robinson MD

Grand Rounds – Dec. 12th, 2011





Is geriatric surgery a specialty?

**General
Surgery**

**Cardiothoracic
Surgery**

**Orthopedic
Surgery**

**Transplant
Surgery**

**Surgical
Oncology**

Neurosurgery

Plastic Surgery

Urology

**Vascular
Surgery**

Proposed Competencies in Geriatric Patient Care

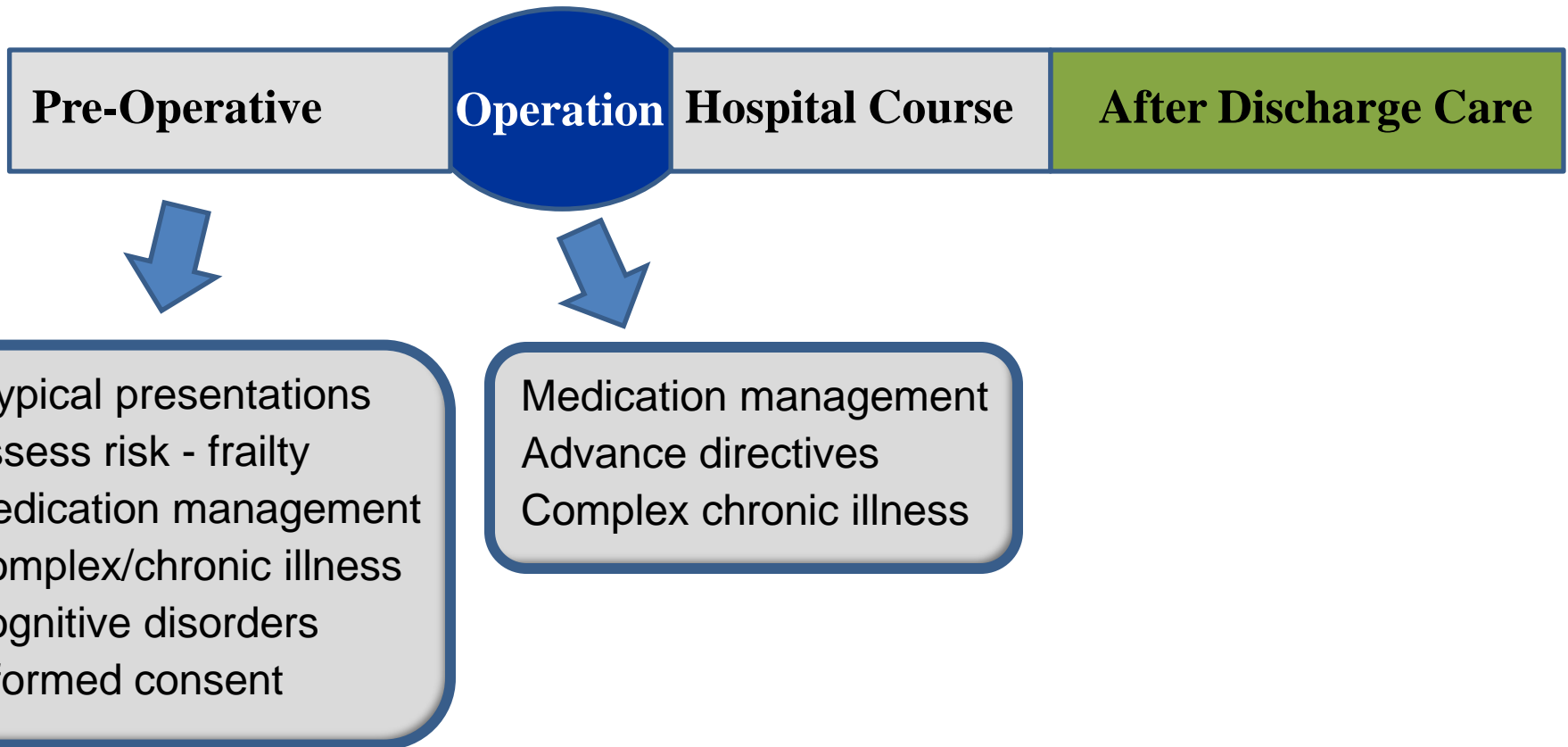


Proposed Competencies in Geriatric Patient Care

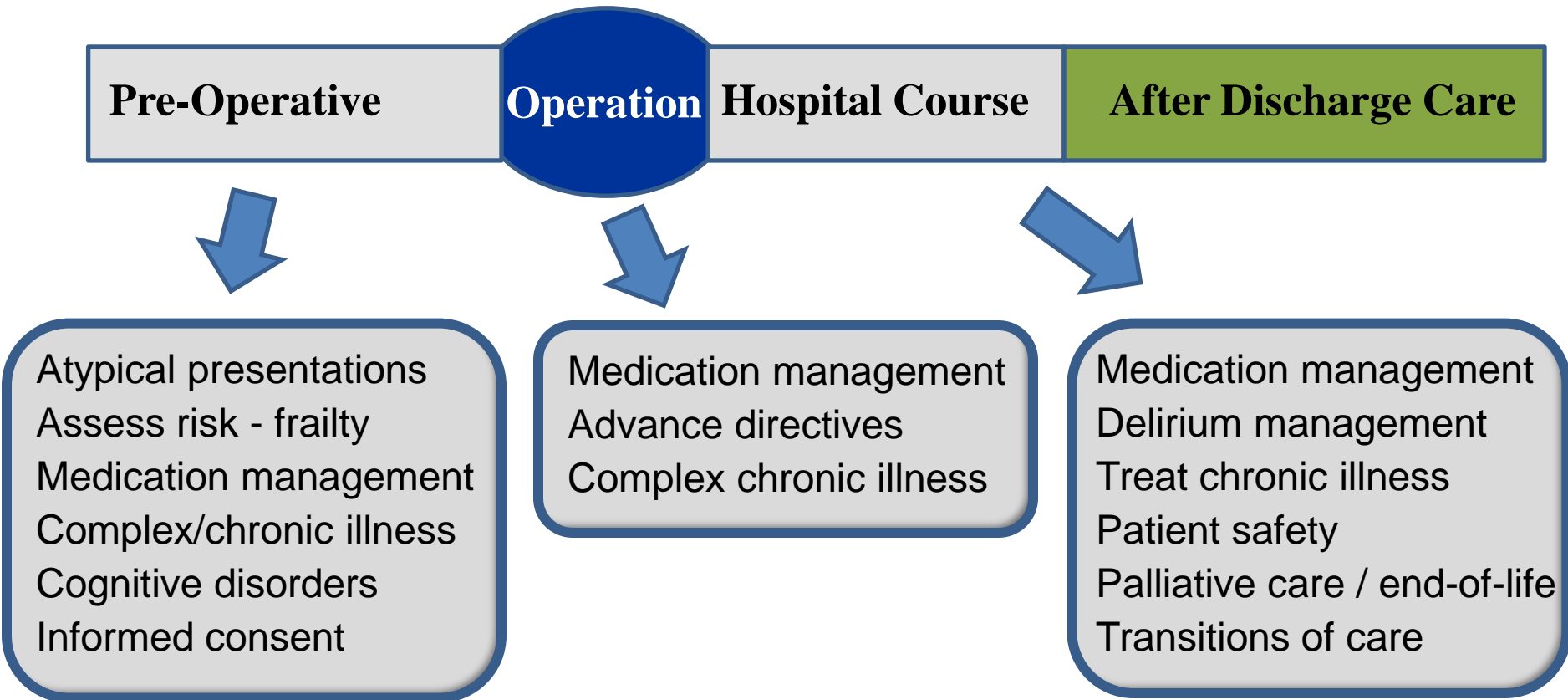


Atypical presentations
Assess risk - frailty
Medication management
Complex/chronic illness
Cognitive disorders
Informed consent

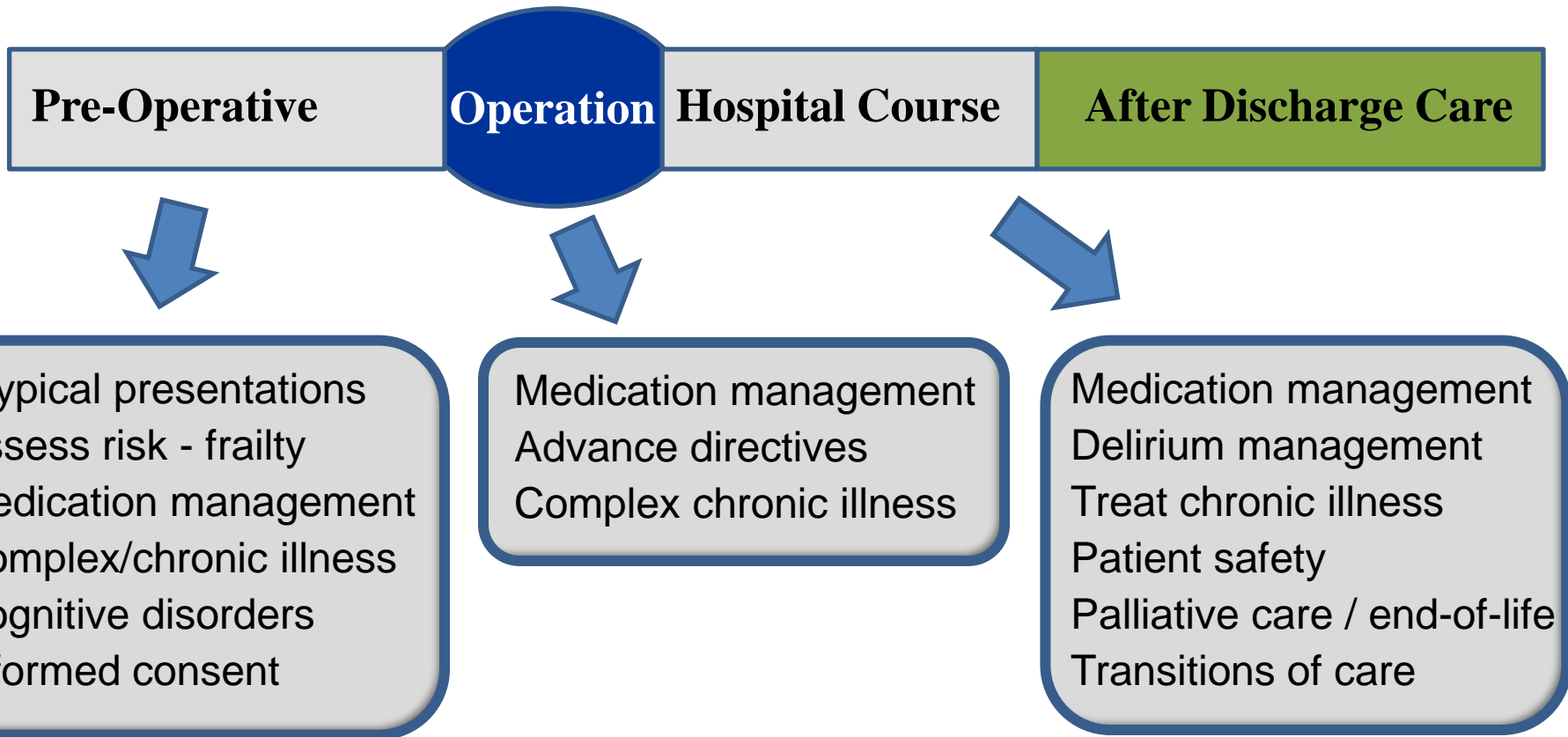
Proposed Competencies in Geriatric Patient Care for Use in Assessment for Initial and Continued Board Certification of Surgical Specialists



Proposed Competencies in Geriatric Patient Care



Proposed Competencies in Geriatric Patient Care for Use in Assessment for Initial and Continued Board Certification of Surgical Specialists



Geriatric Surgery – Matrix Management Structure

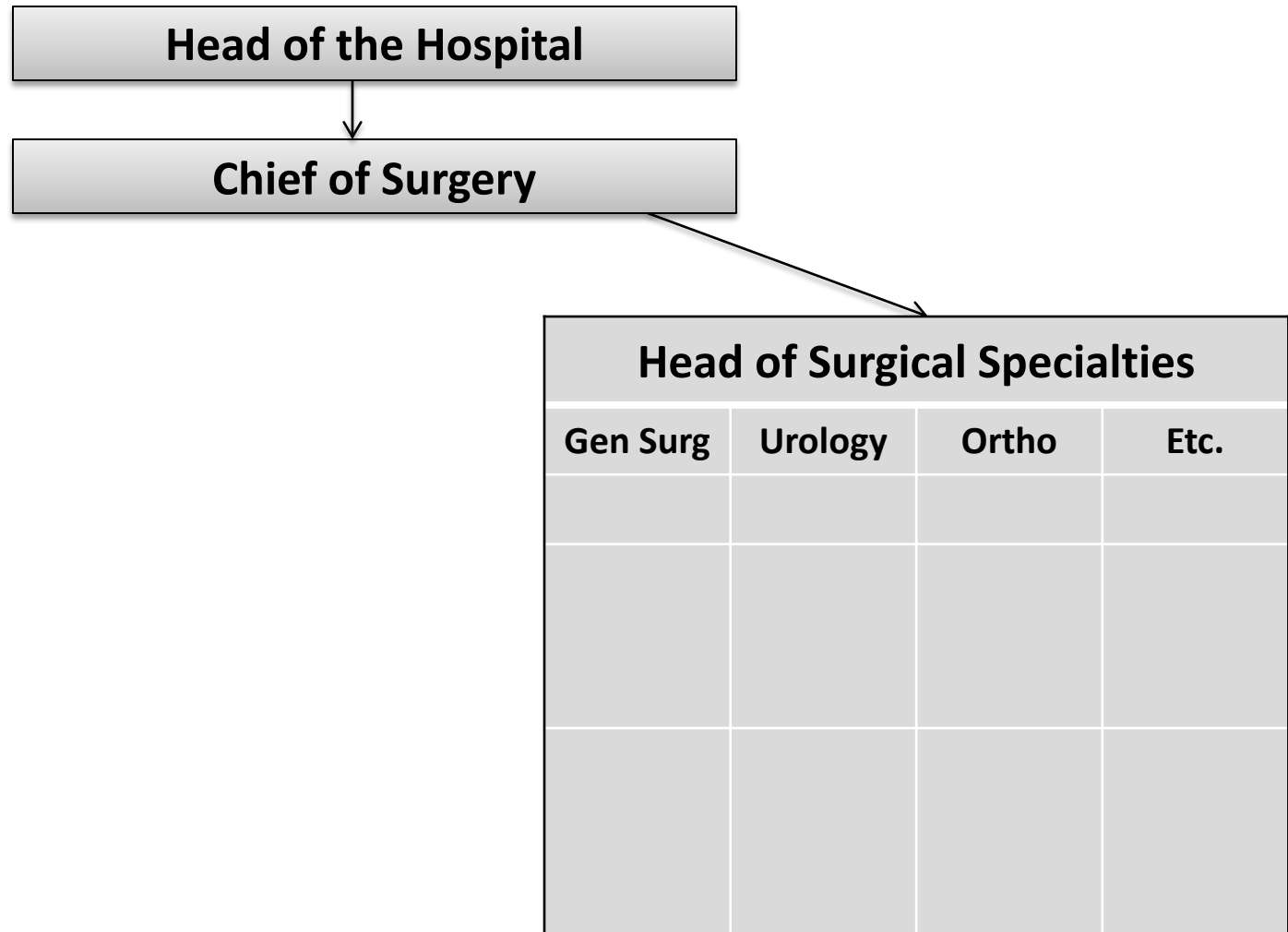


Diagram courtesy of Dr. Ben Eiseman MD.

Geriatric Surgery – Matrix Management Structure

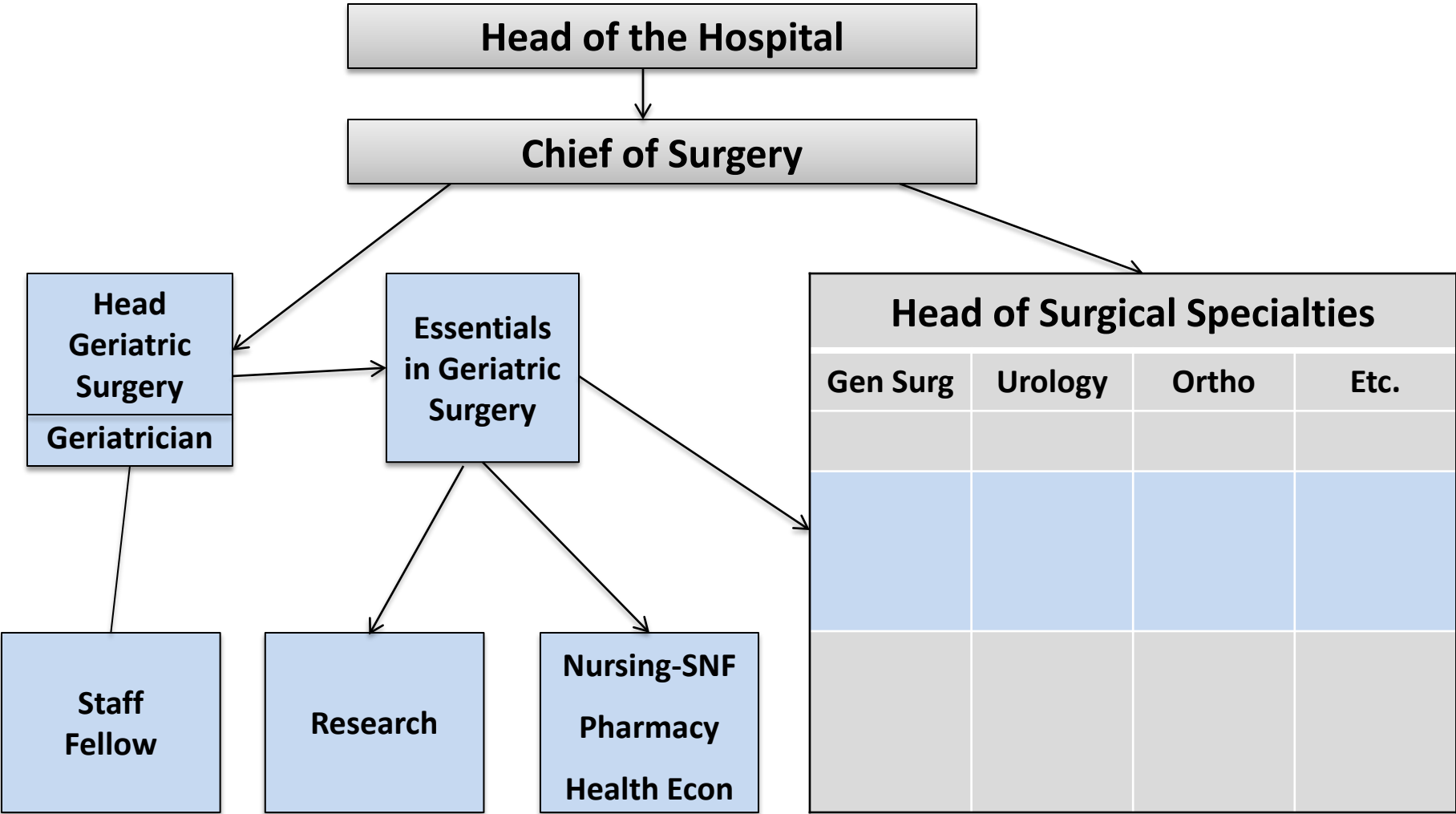
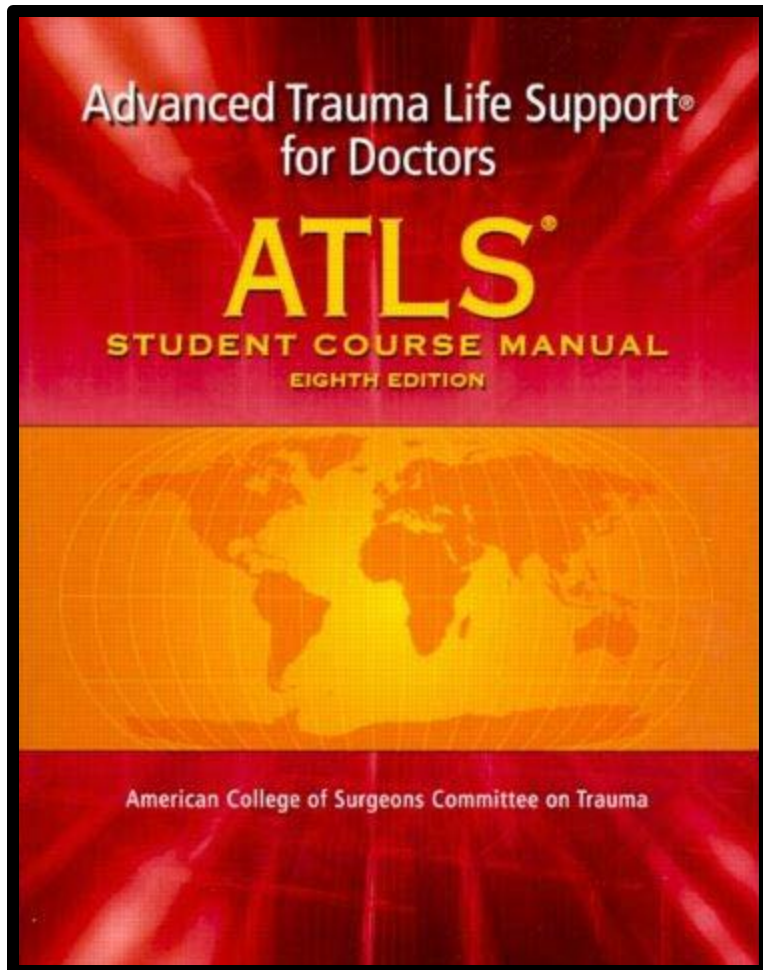


Diagram courtesy of Dr. Ben Eiseman MD.

A Model of Multi-Disciplinary Surgical Care



Complementary Courses

[Advanced Trauma Care for Nurses \(ATCN\) for Registered Nurses](#)

[Pre-Hospital Trauma Life Support \(PHTLS\) for Pre-hospital Care Providers](#)

[Trauma Evaluation and Management \(TEAM\) for Medical Students](#)

Geriatric Surgery – Matrix Management Structure

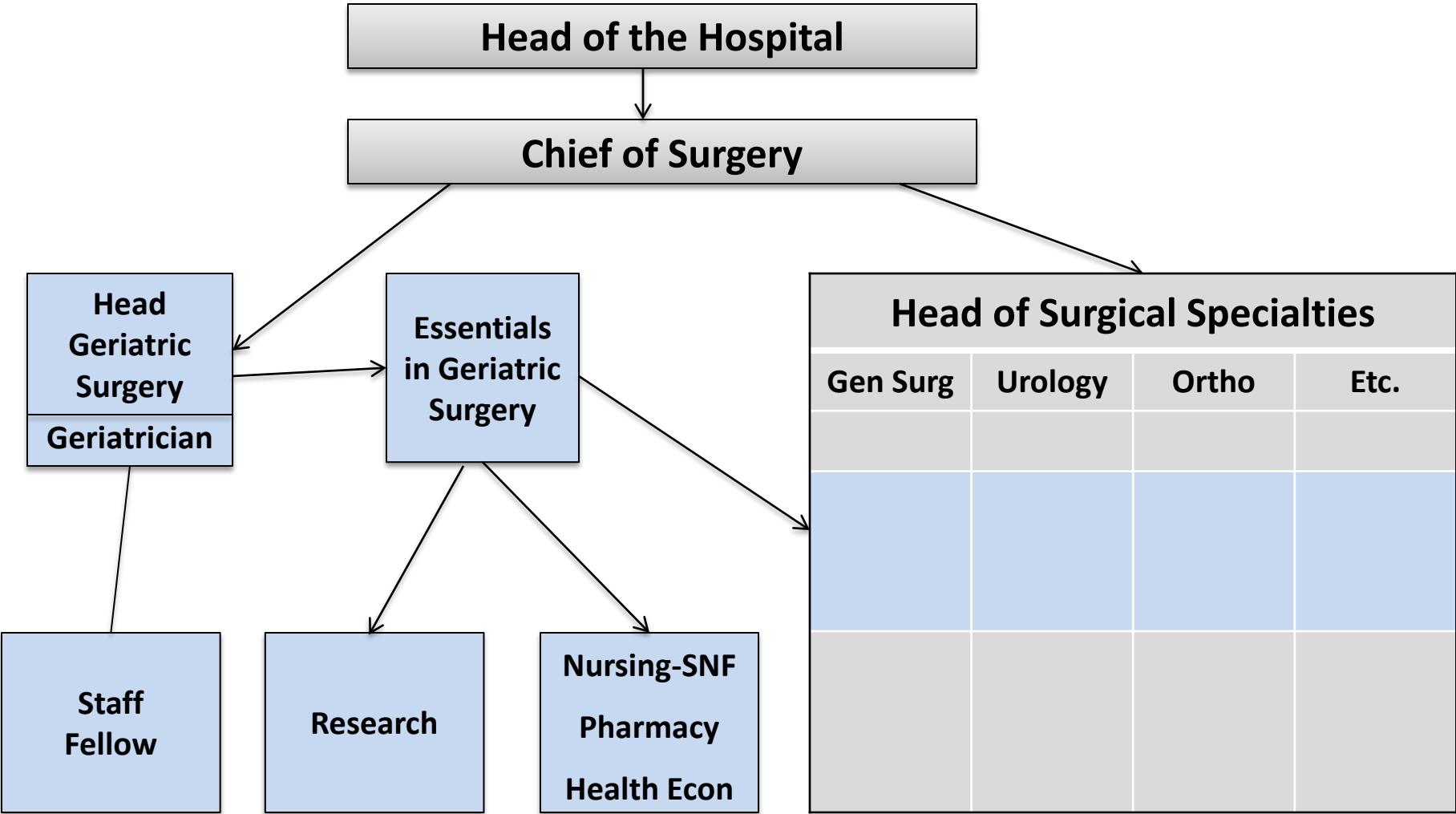


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Co-Managed Geriatric Hip Fracture Center

- Clinical outcomes
 - Decreased length of stay
 - Decreased readmission rate
 - Decreased complications
 - Decreased mortality



Co-Managed Geriatric Hip Fracture Center

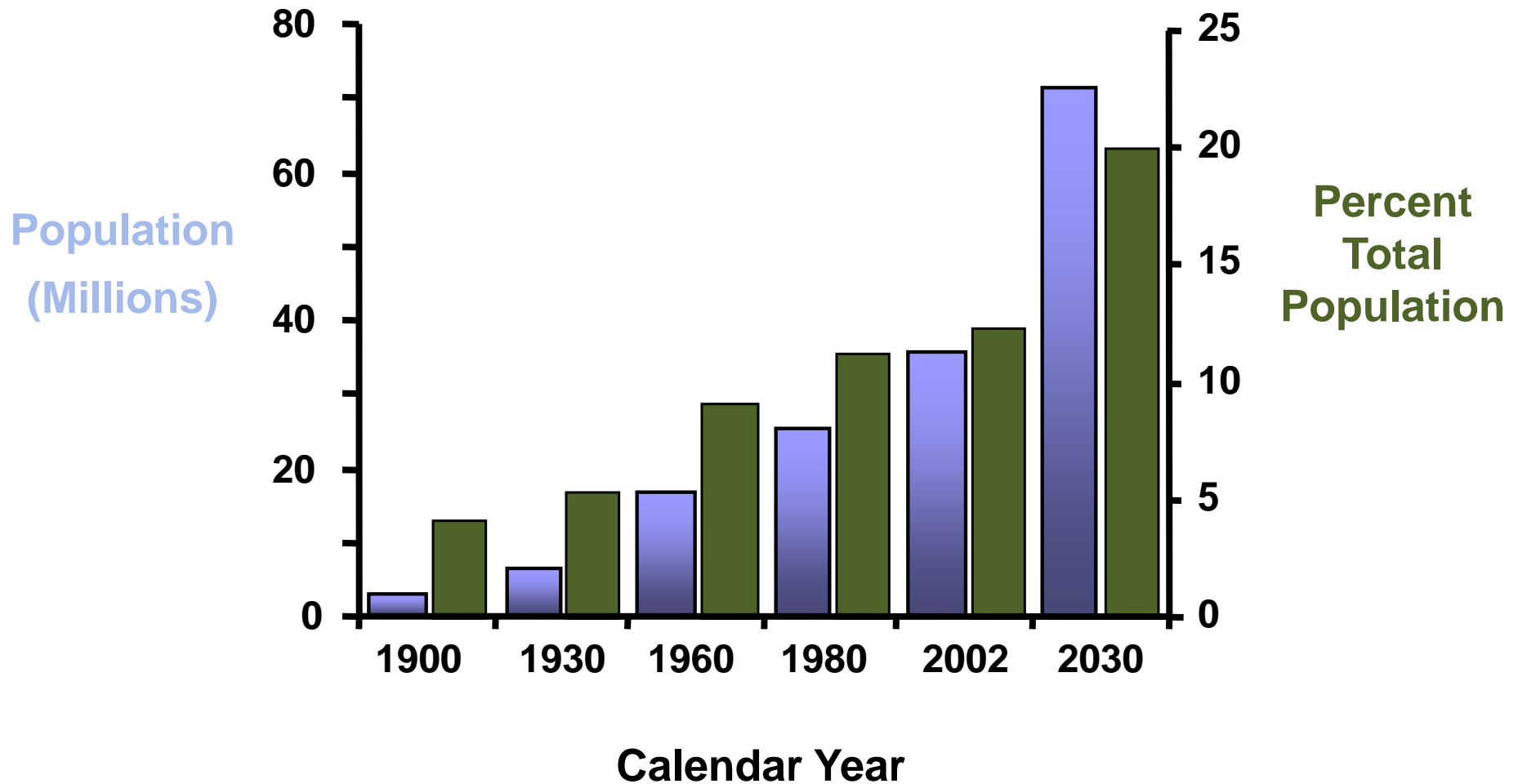
- Clinical outcomes
 - Decreased length of stay
 - Decreased readmission rate
 - Decreased complications
 - Decreased mortality
- Cost of caring for hip fractures was 66.7% of expected cost.



Age Demographic by Surgical Specialty

Surgical Specialty	Age > 65 years
Cardiovascular	51%
Thoracic	48%
Urologic	45%
Gastrointestinal	43%
Orthopedic	39%
Ophthalmologic	34%
All	35%

U.S. Population Aged 65 and Over



Geriatric Surgery – Matrix Management Structure

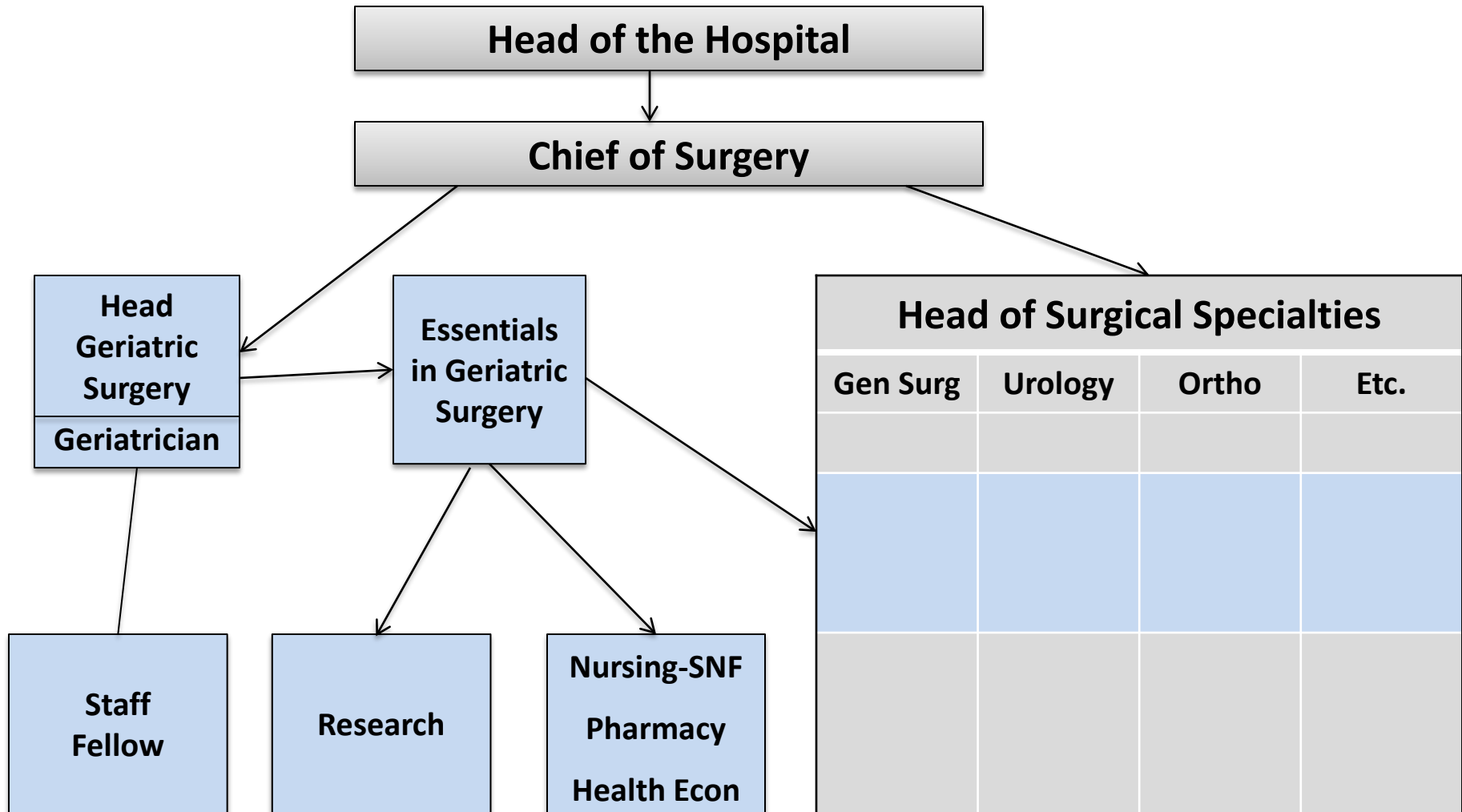
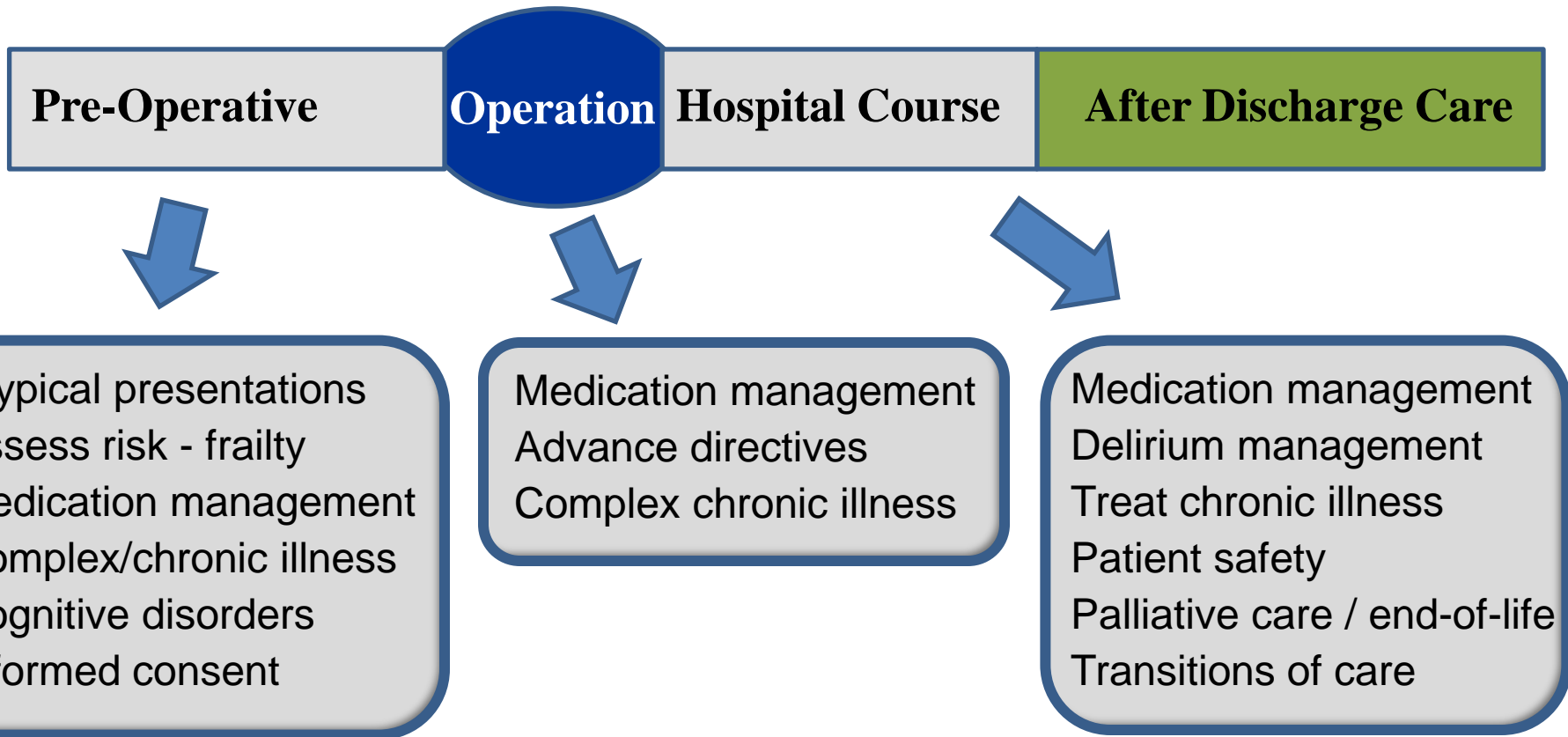
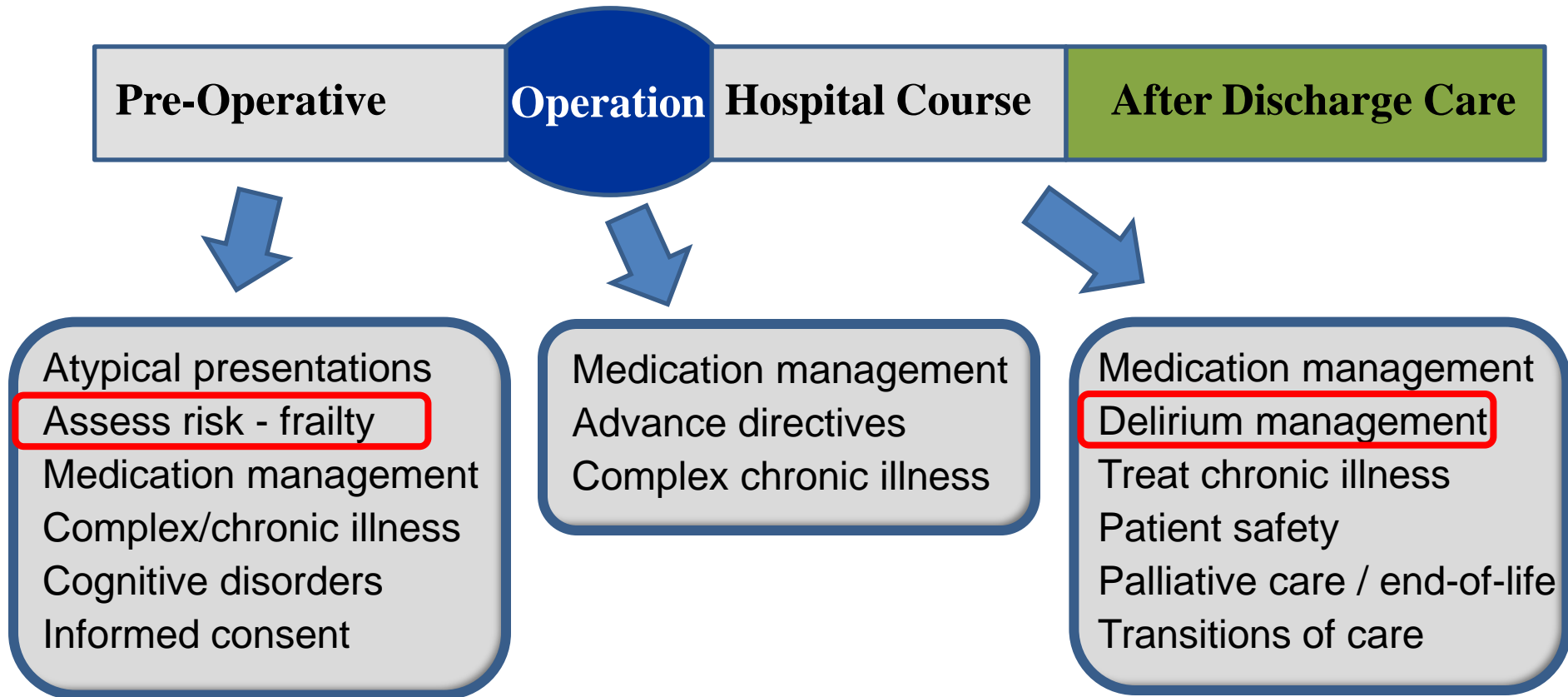


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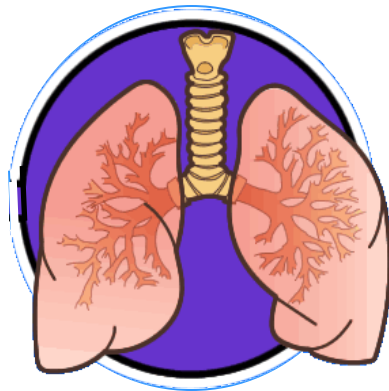


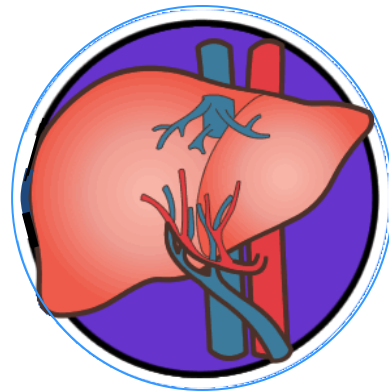
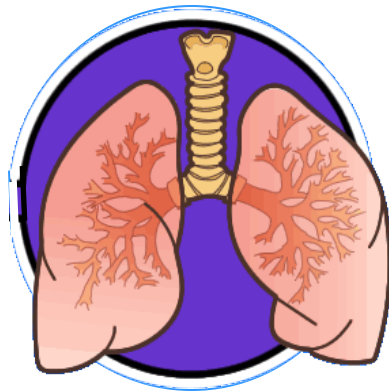


**To operate or not to operate,
that is the question.**

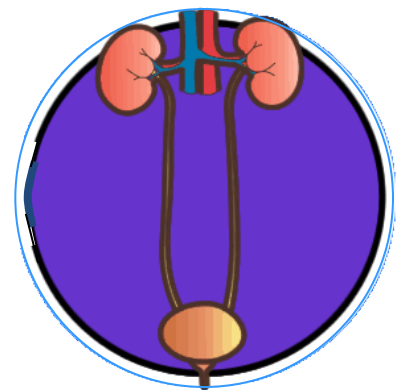
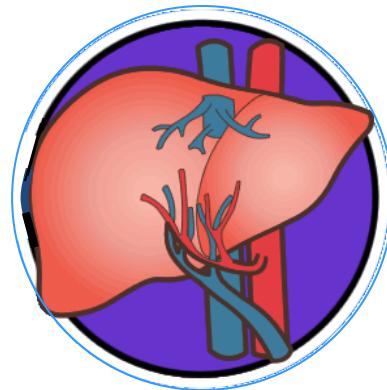
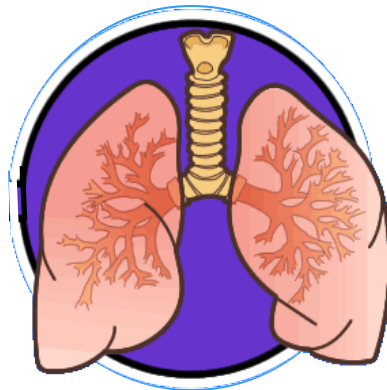


Circulation (2007) 116:1971.





Hepatology (2001) 33:464.

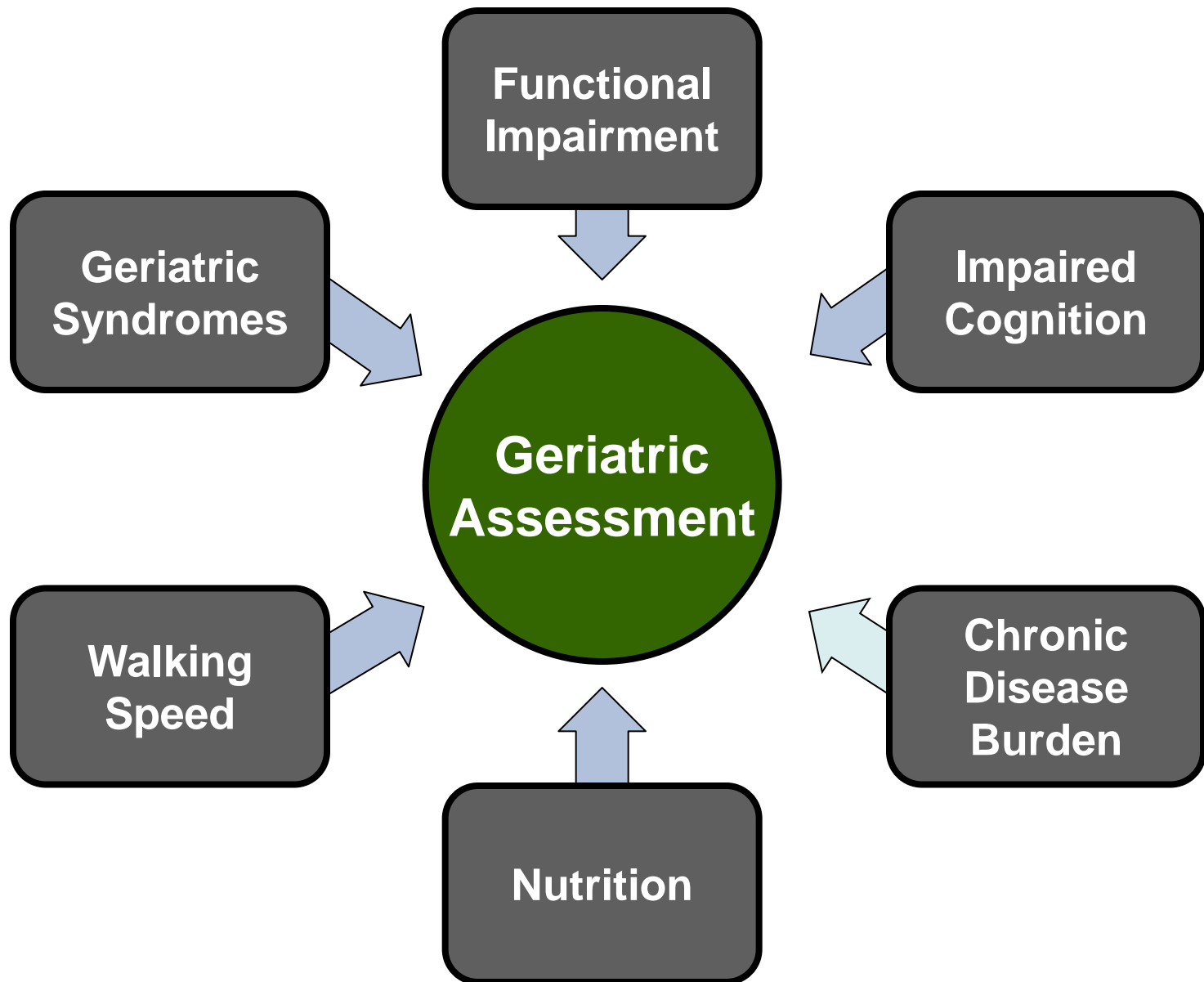


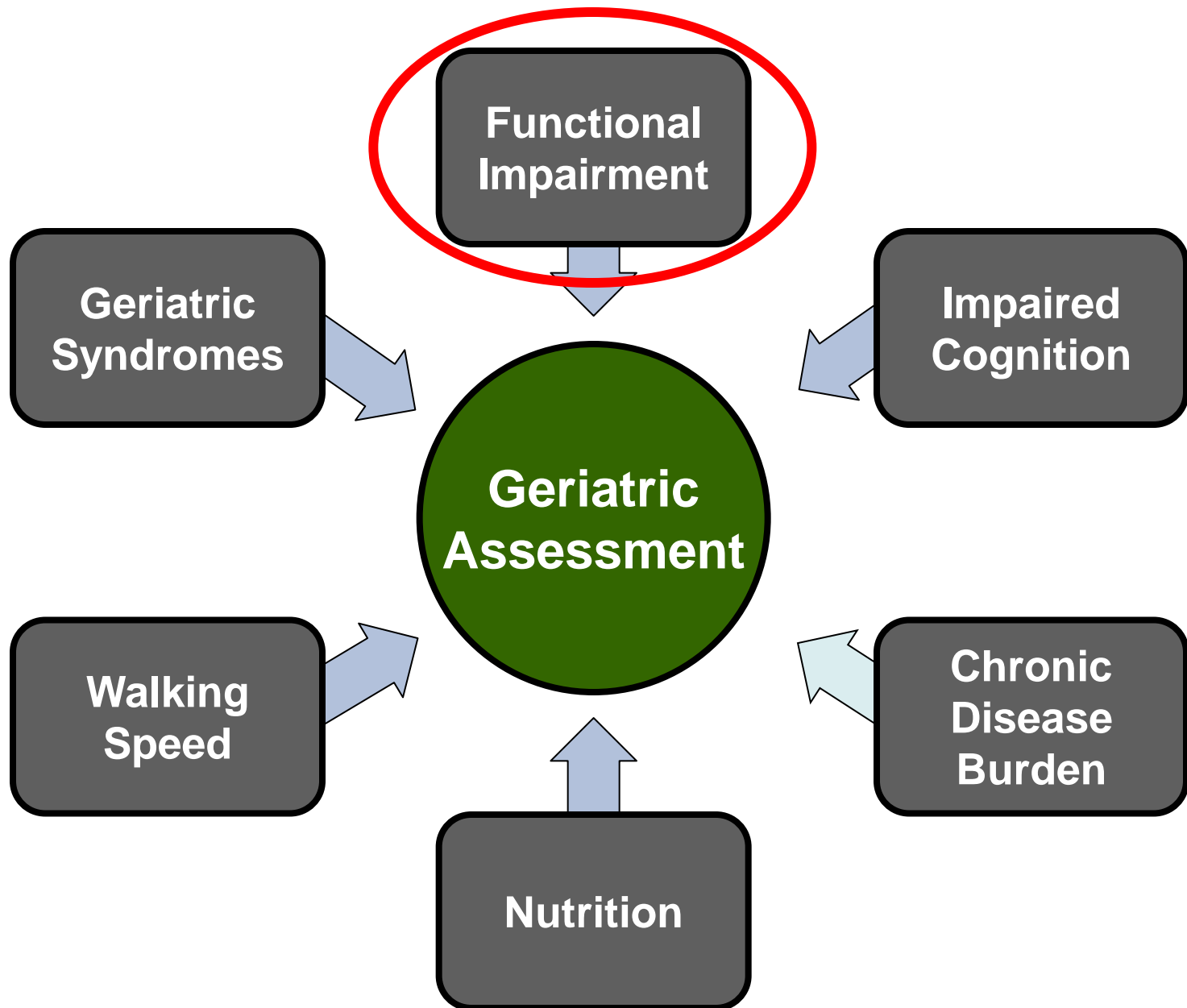


Traditional pre-operative risk assessment strategy does not distinguish risk in these two individuals.



Risk stratifying the geriatric patient requires assessment of vulnerability unique to older adults.





Geriatric Assessment - Function

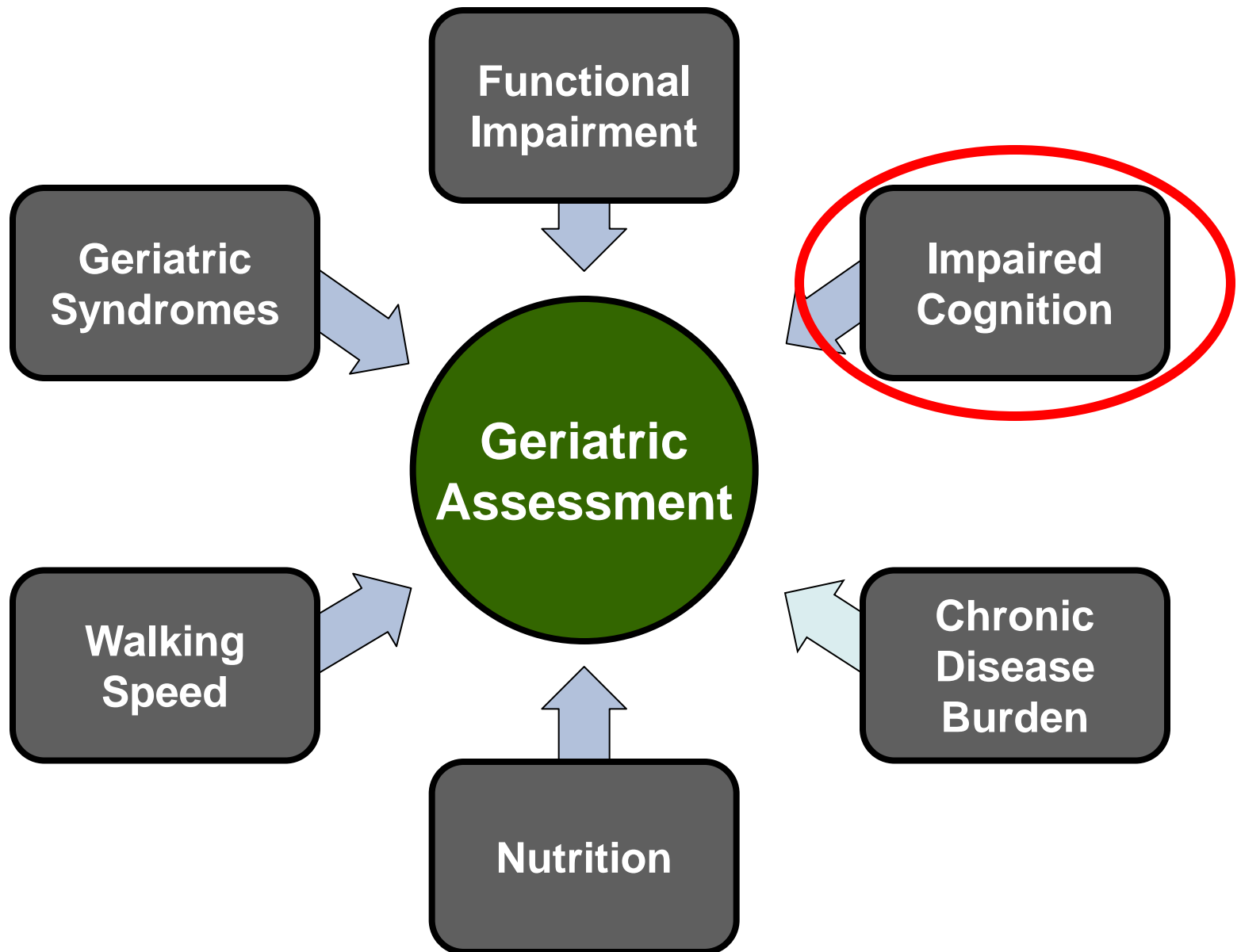
Activities of Daily Living (ADLs)

- **Bathing**
- **Dressing**
- **Transferring**
- **Toileting**
- **Grooming**
- **Feeding**

Geriatric Assessment - Function

Instrumental Activities of Daily Living (IADLs)

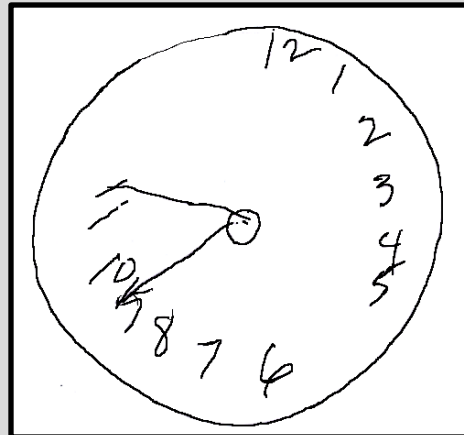
- Using the telephone
- Shopping
- Food preparation
- Housekeeping
- Doing laundry
- Utilization of transportation
- Ability to medicate
- Ability to handle finances

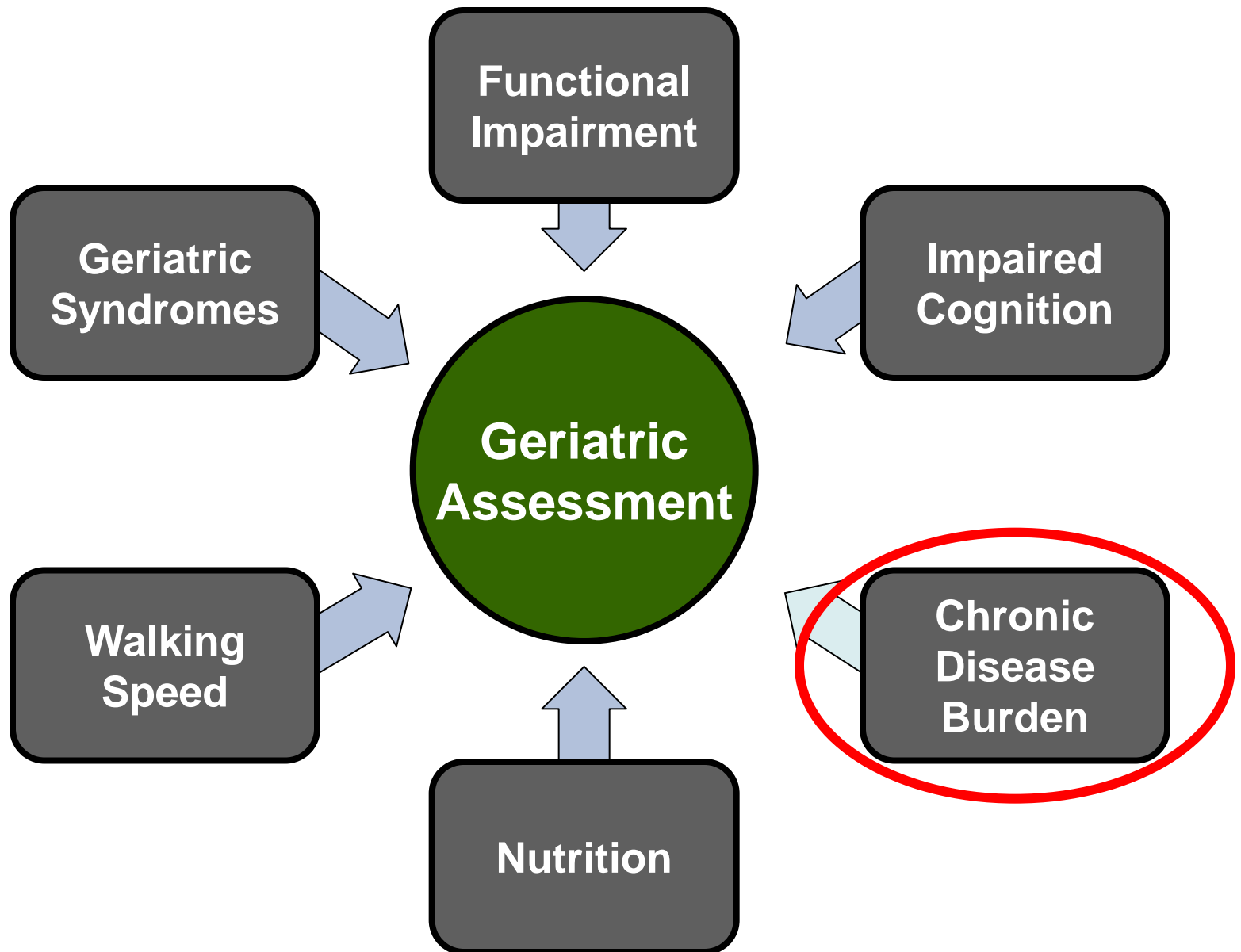


Geriatric Assessment - Cognition

Mini-Cog

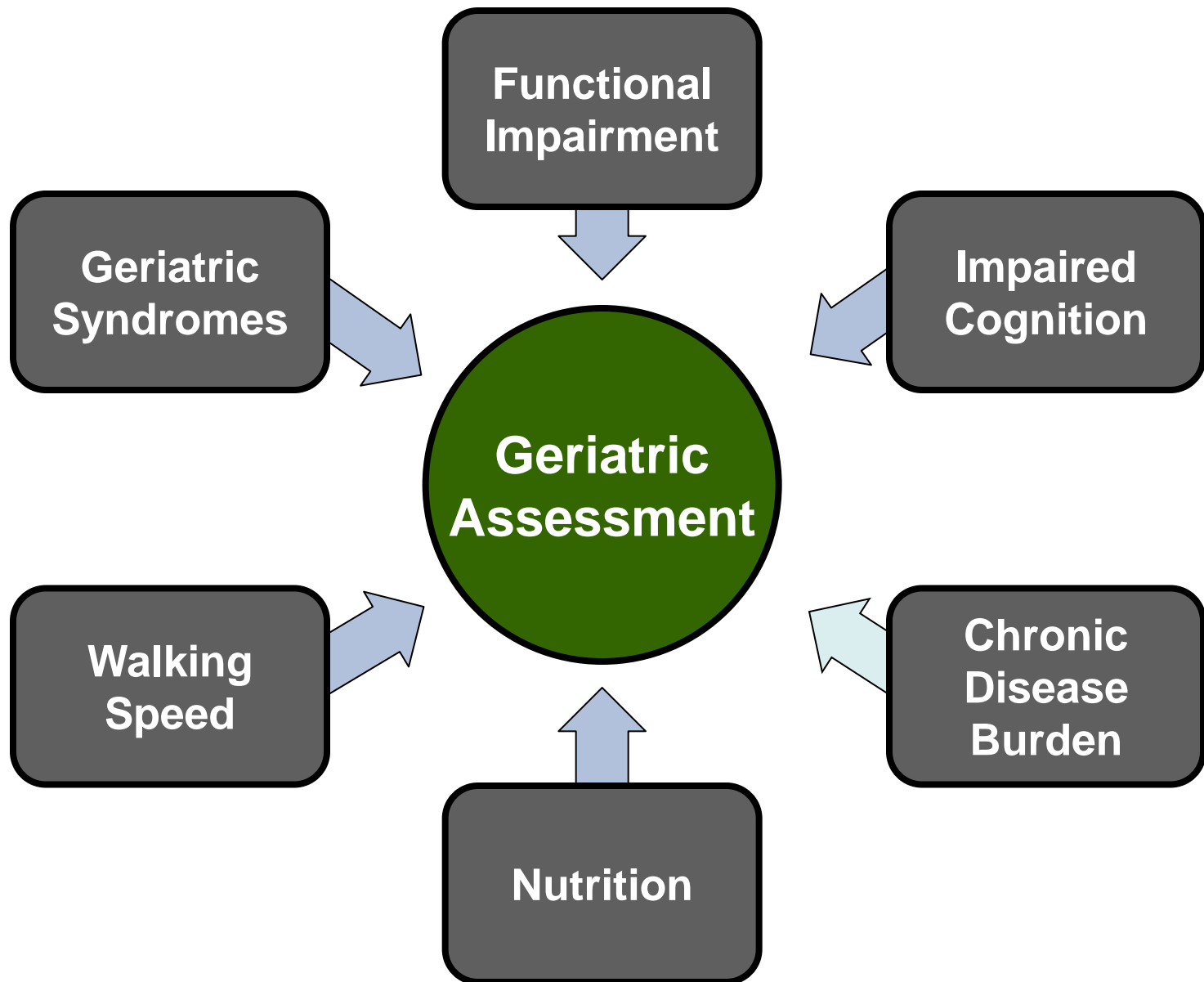
- Three item recall - apple, table, penny
- Clock Draw - draw clock face, hands at 11:10





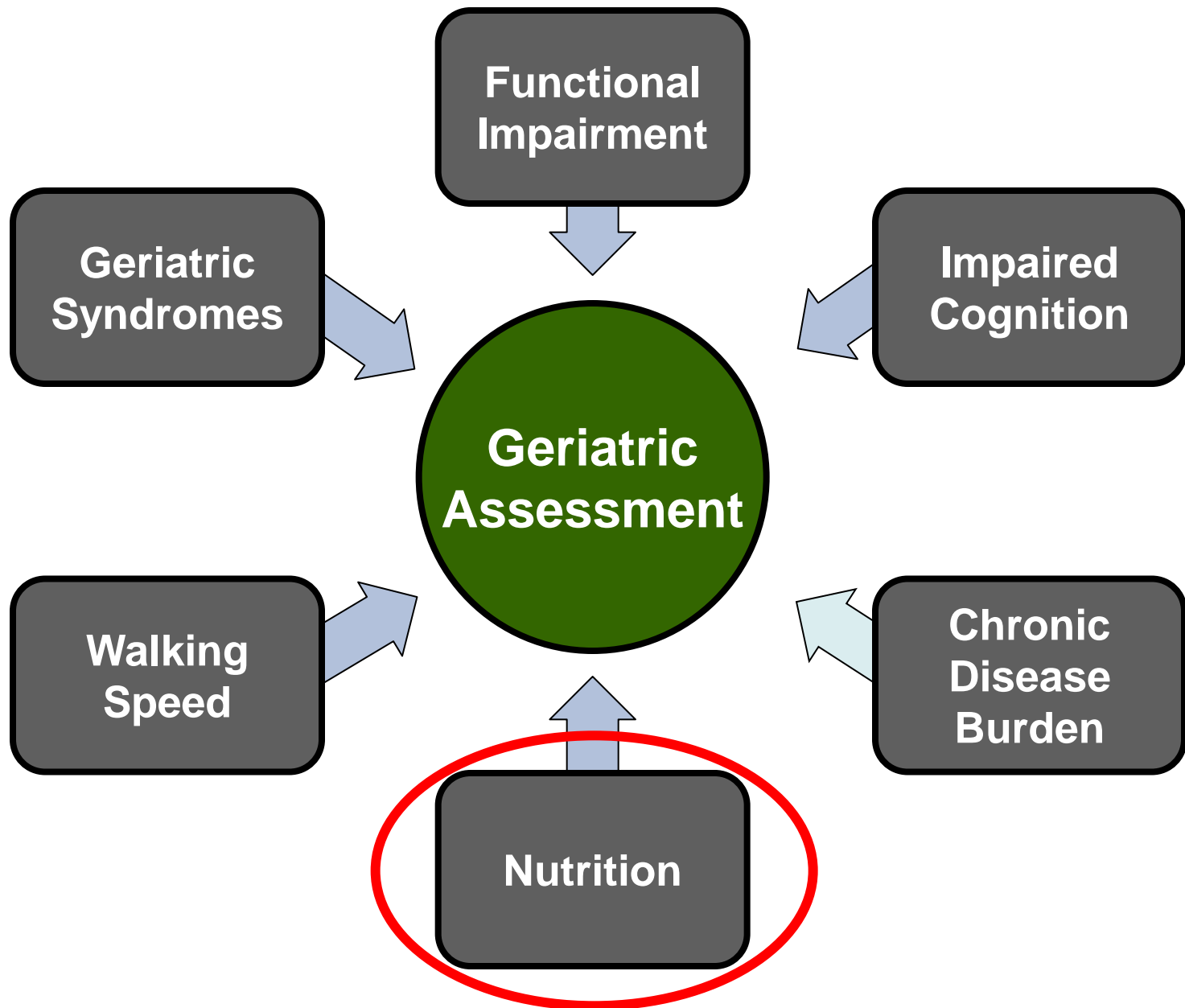
Geriatric Assessment – Chronic Disease Burden

- Charlson Index
- Cumulative Illness Rating Scale
- Polypharmacy
- ASA Score
- Anemia of chronic disease (< 35%)



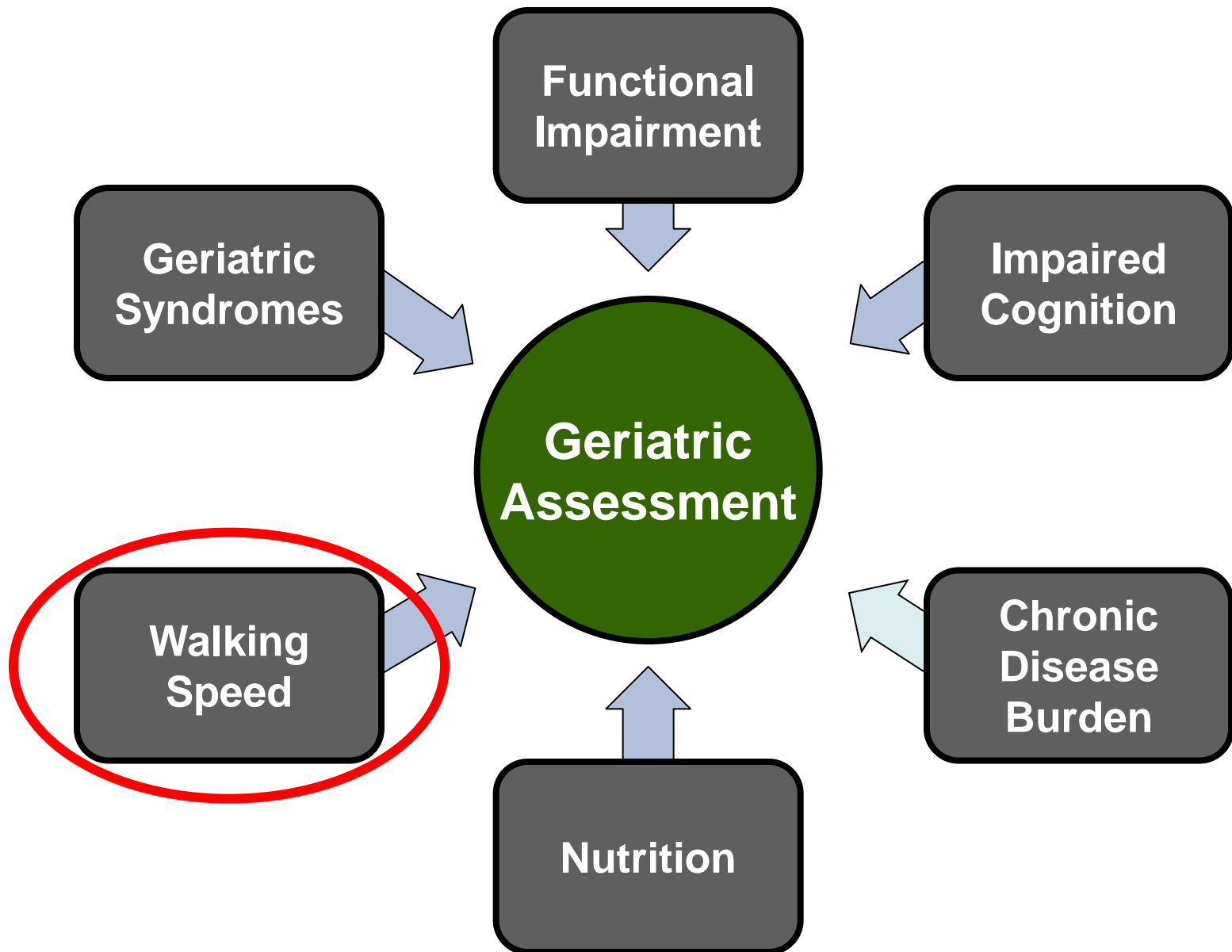


Risk stratifying the geriatric patient requires assessment of vulnerability unique to older adults.



Geriatric Assessment – Nutrition

- 10 lbs. weight loss in past year
- 10% weight loss in past year
- Albumin level
- Mini-Nutritional Assessment

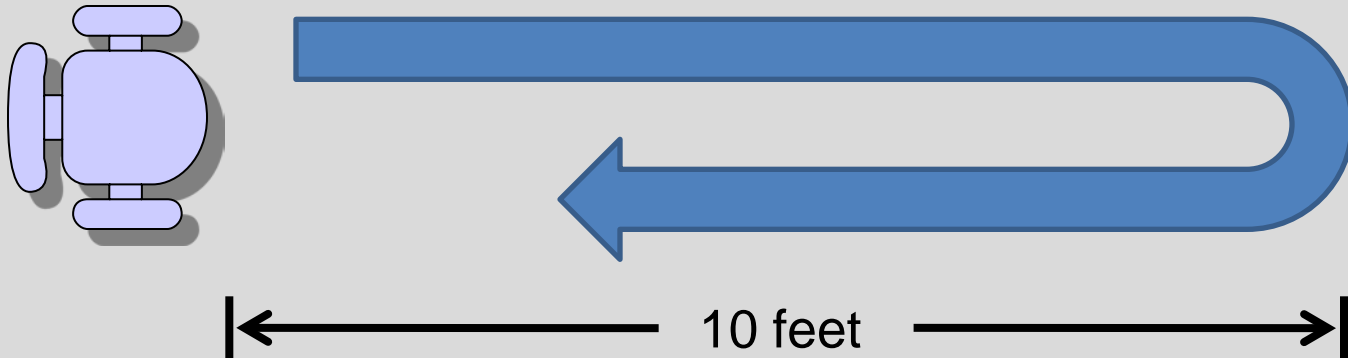


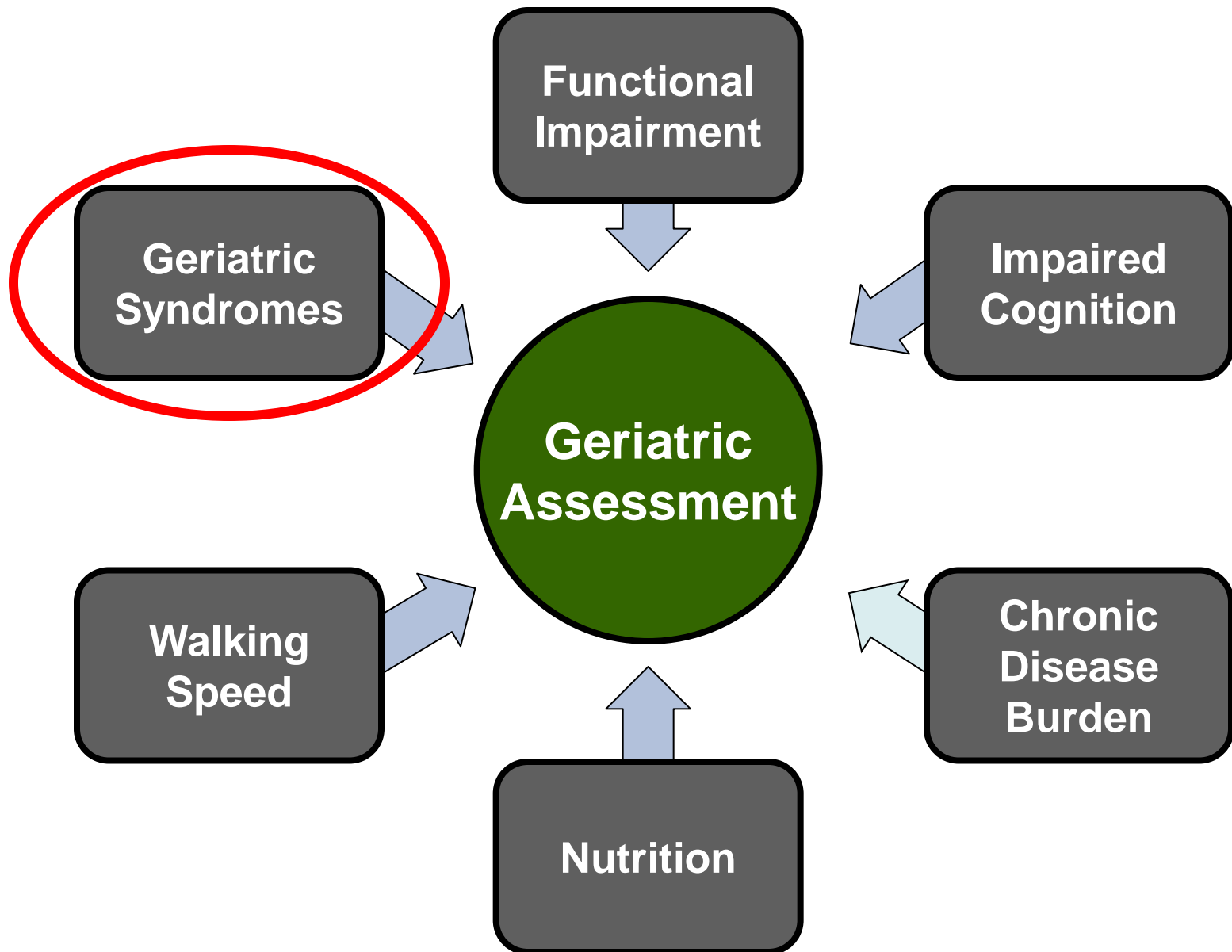
Geriatric Assessment – Walking Speed

Timed ambulation over 15 feet

Timed ambulation over 6 meters

Timed Up-and-Go

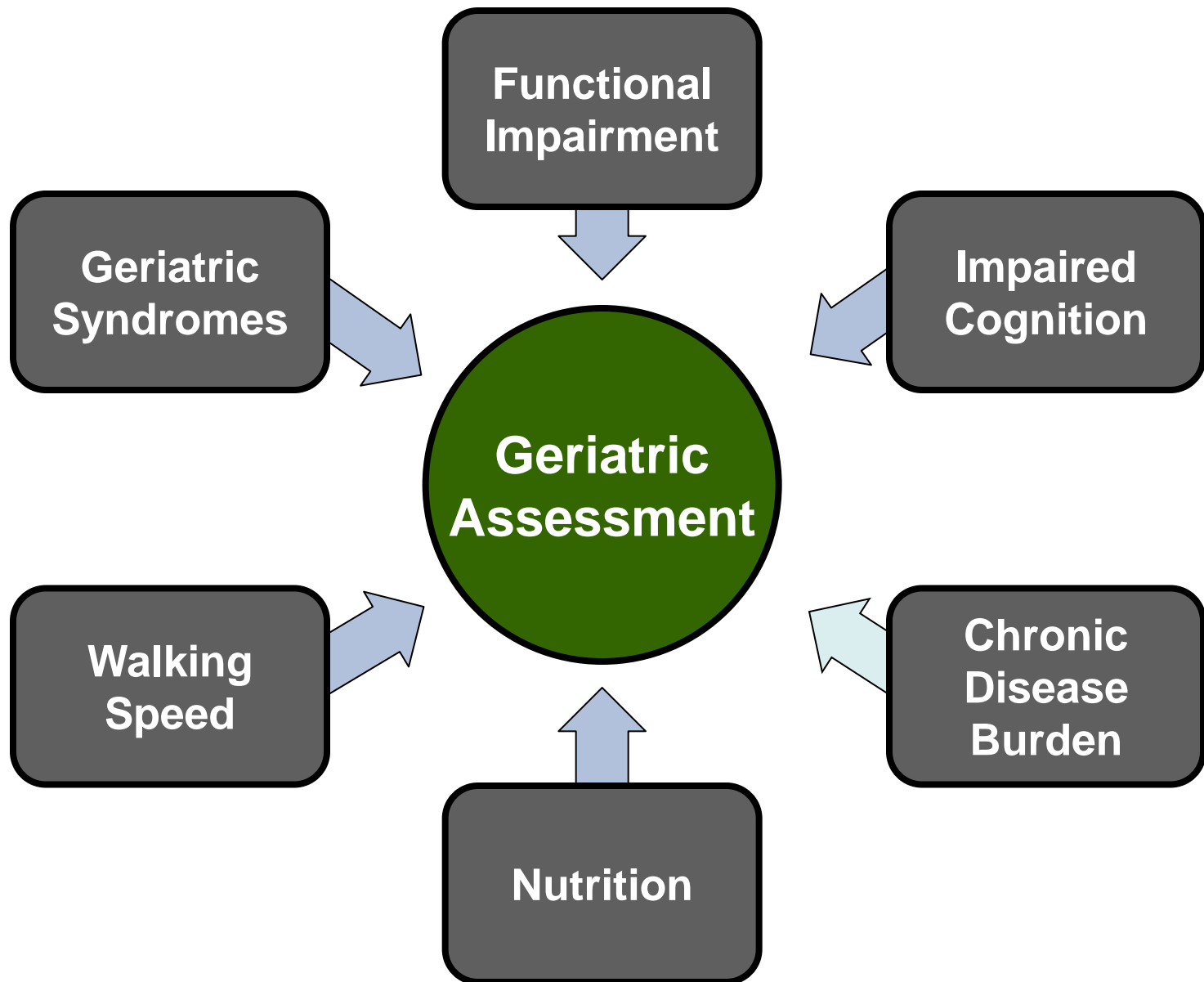




Geriatric Assessment – Geriatric Syndromes

A geriatric syndrome represents accumulated impairments in multiple organ systems that results in a clinical event.

- Falls
- Continence



Subject ID - _____

Date - _____

CHARLSON INDEX (retrospective)

Condition	Score
Myocardial Infarction	1
Congestive Heart Failure	1
Peripheral Vascular Disease	1
Cerebrovascular Disease	1
Dementia	1
COPD	1
Connective Tissue Disease	1
Ulcer Disease	1
Mild Liver Disease	1
Diabetes	1
Hemiplegia	2
Moderate to severe renal disease	2
Diabetes with end organ damage	2
Any Tumor	2
Leukemia	2
Lymphoma	2
Moderate to severe liver disease	3
Metastatic solid tumor	6
AIDS	6

DEPRESSION SCREEN

Ask following questions:

1. During the past month, have you been bothered by feeling down, depressed or hopeless?

2. During the past month, have you been bothered by little interest or lack of pleasure in doing things?

Score 1 point is answer YES to question
(0=no depression; 2=depression)

DEPRESSION SCORE TOTAL 0 1 2

BARTHEL INDEX

Activity	Score
FEEDING	0 = unable 5 = needs help 10 = independent
BATHING	0 = dependent 5 = independent (or in shower)
GROOMING	0 = needs to help 5 = independent
DRESSING	0 = dependent 5 = needs help 10 = independent
BOWELS	0 = incontinent 5 = occasional accident 10 = continent
BLADDER	0 = incontinent 5 = occasional accident 10 = continent
TOILET USE	0 = dependent 5 = needs some help 10 = independent
TRANSFERS	0 = unable 5 = major help (physical) 10 = minor help (verbal) 15 = independent
MOBILITY	0 = immobile or < 50 yards 5 = wheelchair independent 10 = walks with help > 50 yards 15 = independent > 50 yards
STAIRS	0 = unable 5 = needs help 10 = independent

TOTAL (0-100): _____

GET UP AND GO

Time getting up from chair, walking 10 feet, turn, return to chair, sit down.

TOTAL TIME = _____

KATE ACTIVITIES OF DAILY LIVING SCORE

Circle for dependence in any item listed

- Bathing
- Dressing
- Transferring
- Walking
- Toileting
- Feeding

FALLS

How many times have you fallen in the past 6 months? (circle one)

0 1 2 3 4 5 6 7 8

MINI-COG TEST

1. **THREE ITEM RECALL**
Recall three previous stated words following clock-draw.

Score: 3 = Recalls all three words
2 = Recalls two words
1 = Recalls one word
0 = Recalls no words

2. **CLOCK DRAW**

Draw a clock with the numbers and clock arms on requested time.

Score:
2 = Normal is scored if the numbers on the clock are in the correct location and order, and the hands on the clock display the requested time.
0 = Any abnormality in clock

MINI-COG SCORE 0 1 2 3 4 5
(circle one)

CLOCK DRAW



**Functional
Impairment**

**Impaired
Cognition**

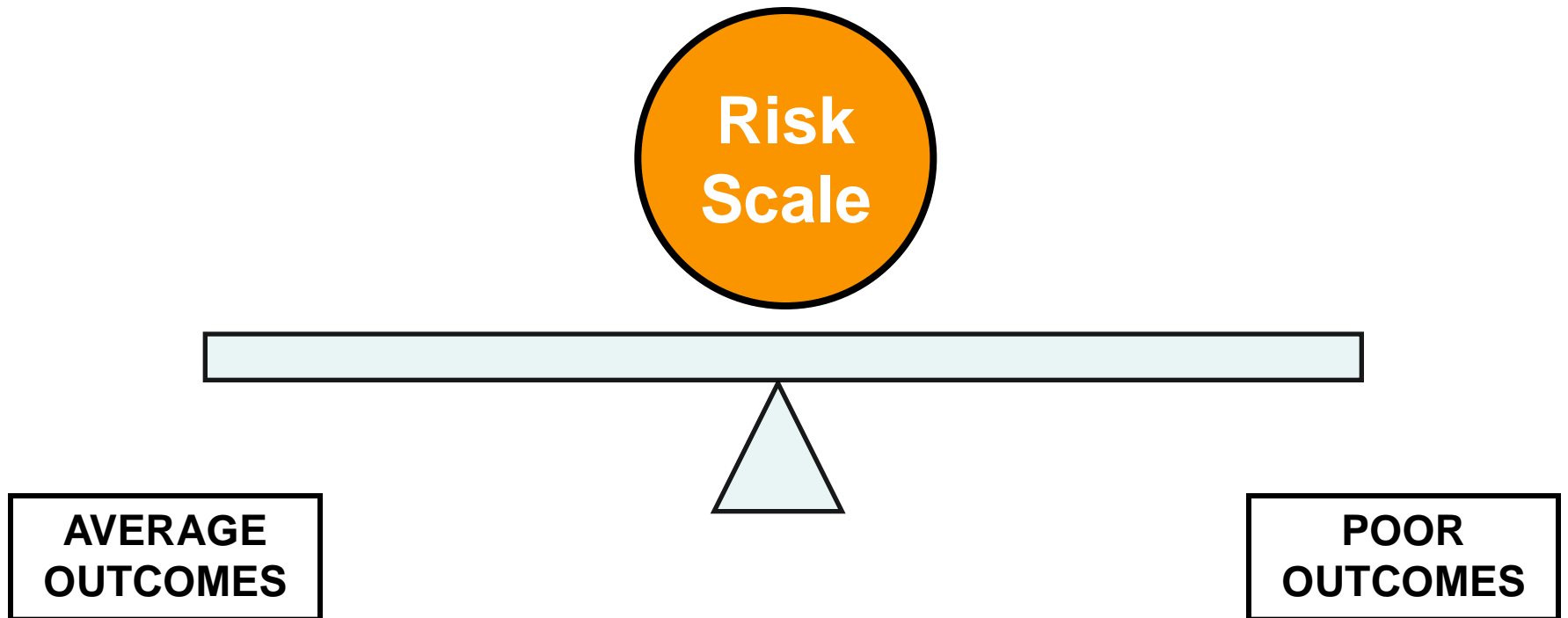
**Chronic
Disease
Burden**

**Walking
Speed**

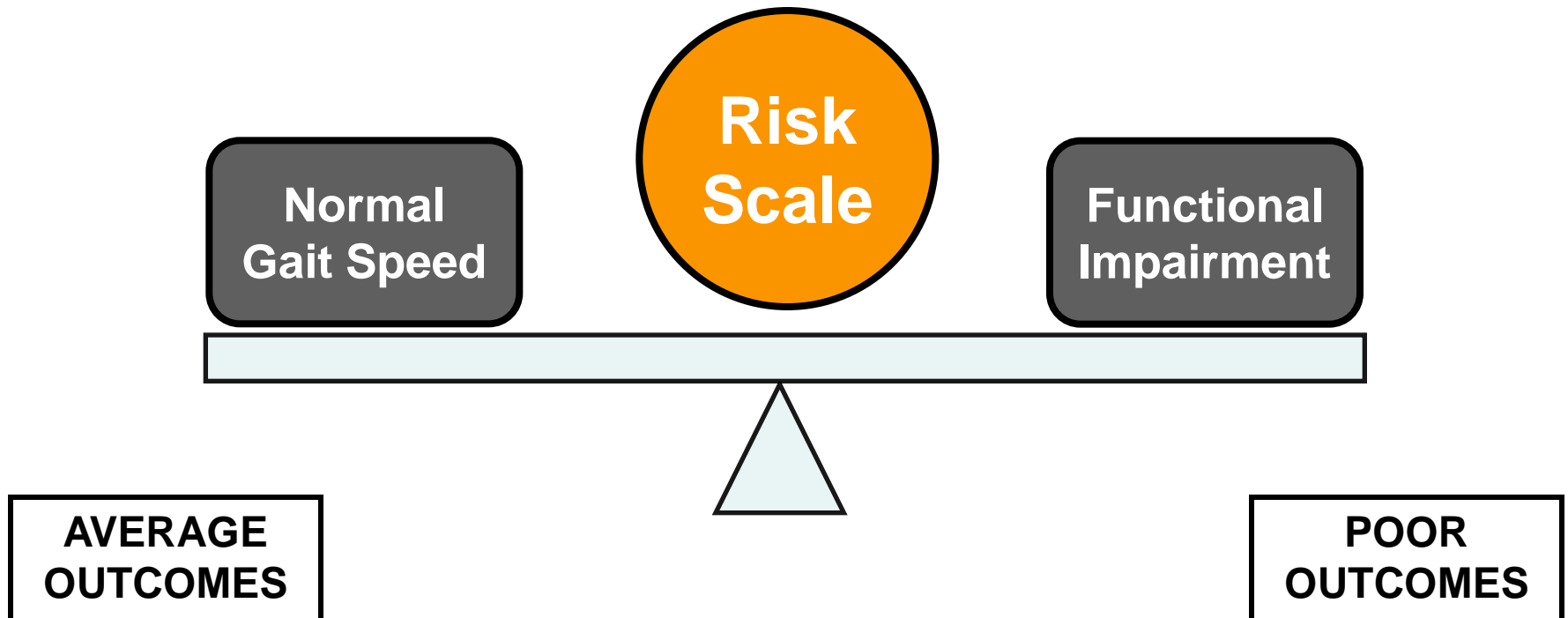
Nutrition

**Geriatric
Syndromes**

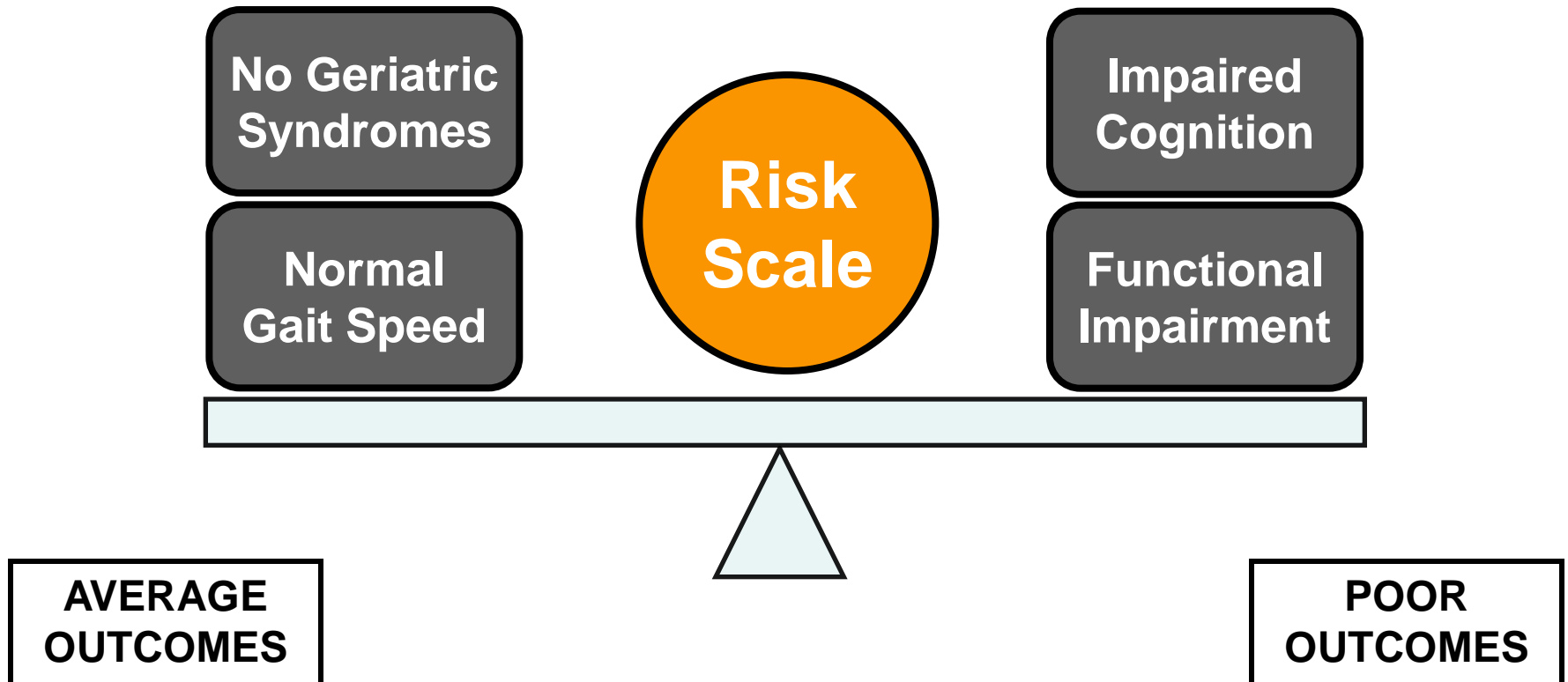
Accumulation of Geriatric “Deficits”



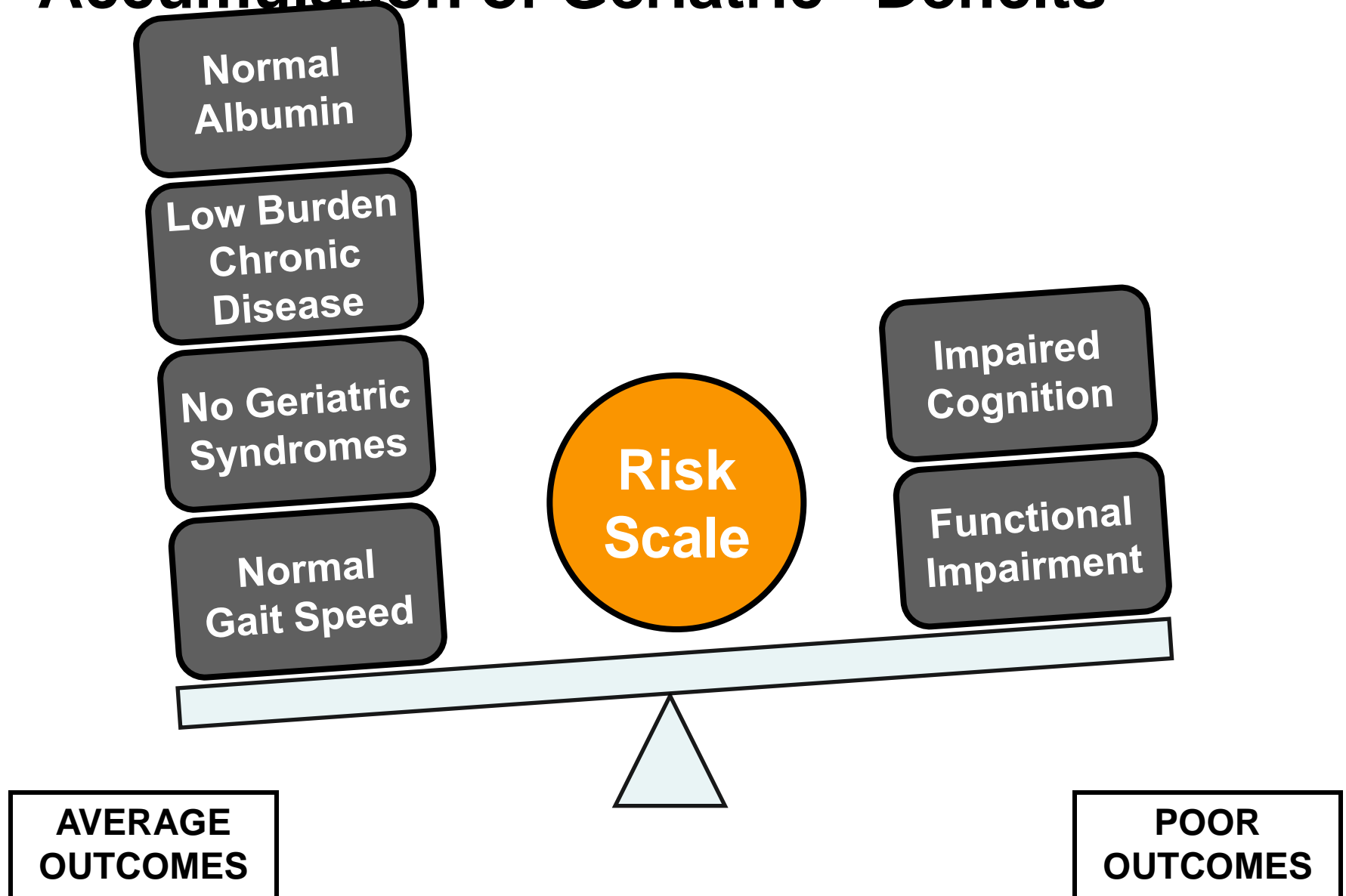
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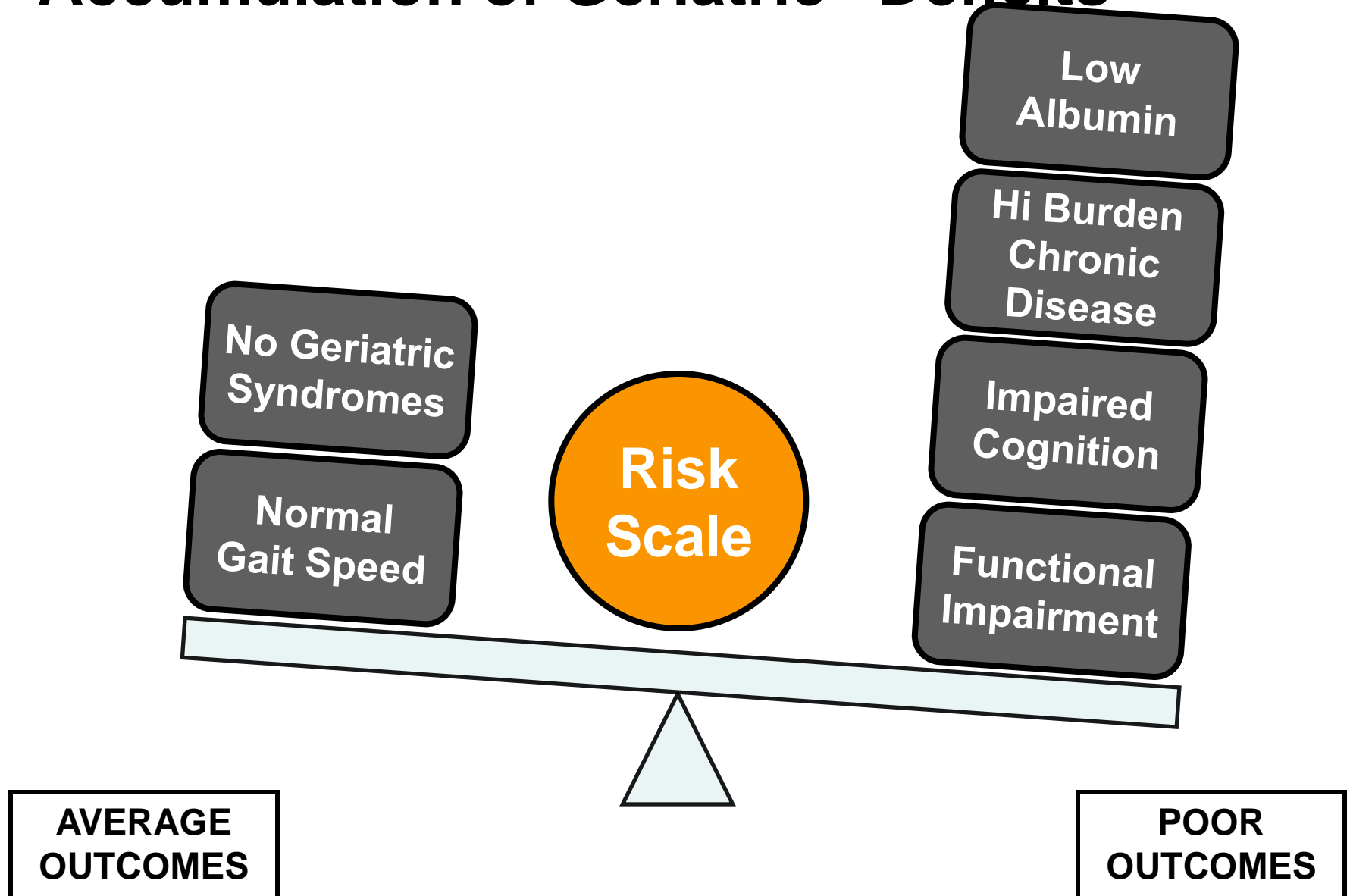
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**Functional
Impairment**

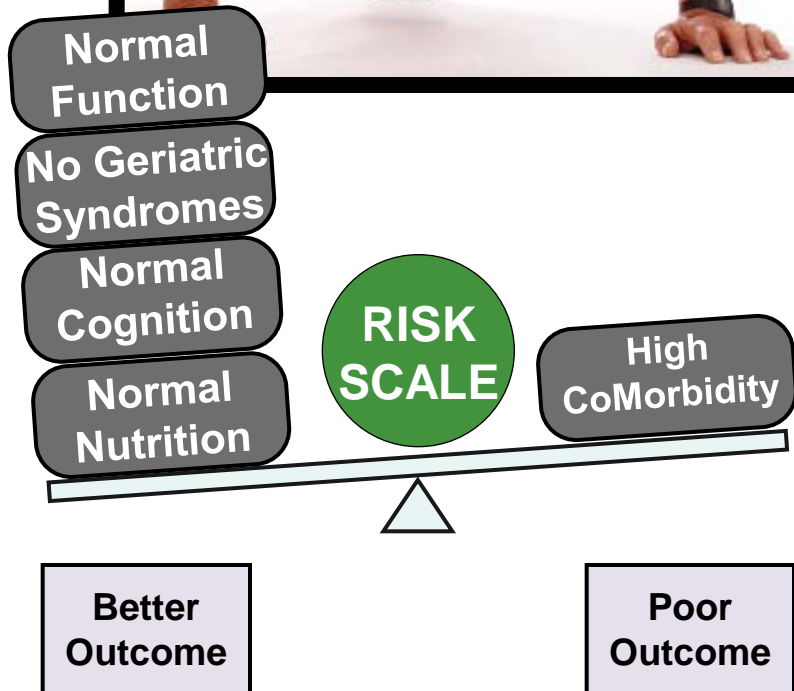
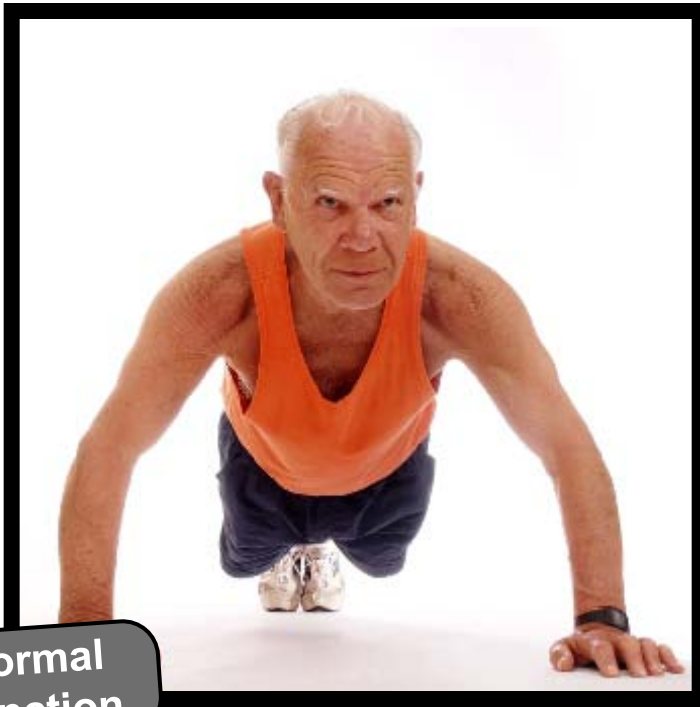
**Impaired
Cognition**

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Disease
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**Walking
Speed**

Nutrition

**Geriatric
Syndromes**



**Pre-Op
Evaluation**

Operation

**Hospital
Course**

**30-Day
Outcomes**

**6-Month
Outcomes**

Group	Abnormal Domains
Non-Frail	0 or 1
Pre-Frail	2 or 3
Frail	4 or more

**Pre-Op
Evaluation**

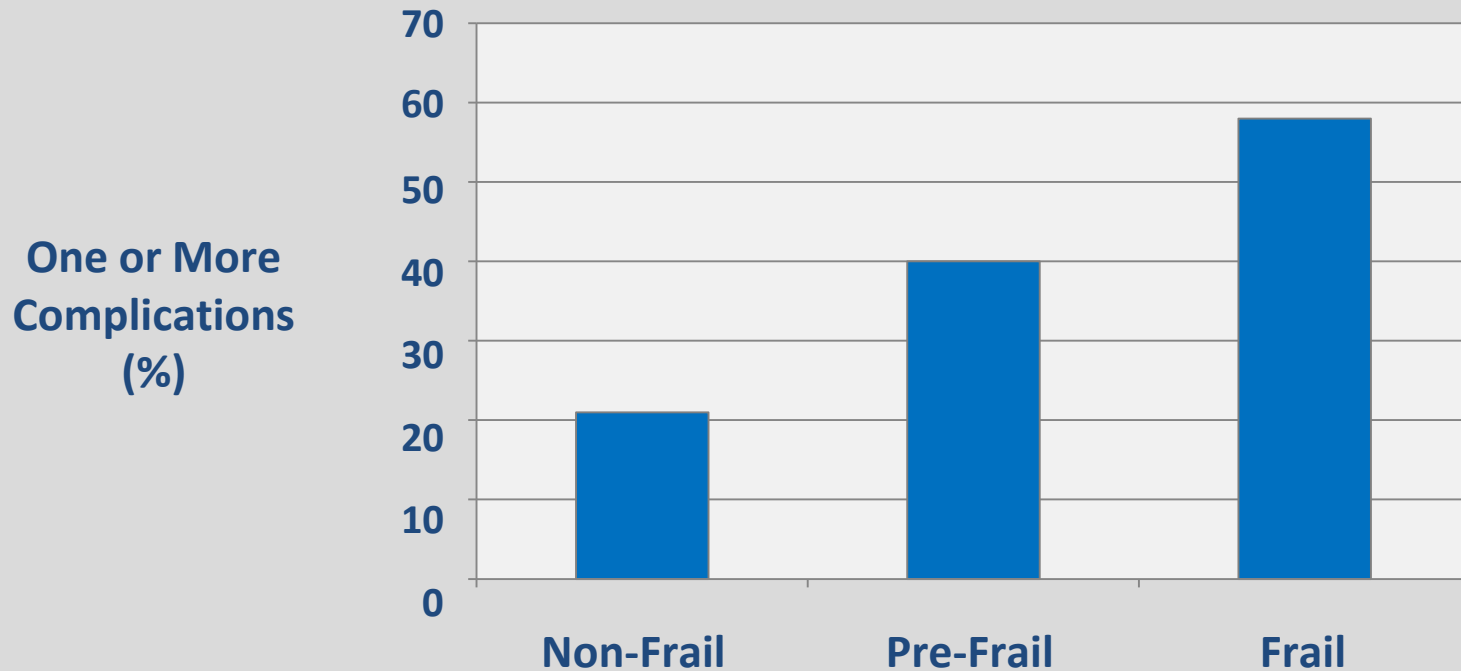
Operation

**Hospital
Course**

**30-Day
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**6-Month
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Post-Operative Complications



*Robinson TN, et al. Ann Surg (2009) 250:449.
Robinson TN, et al. J Am Coll Surg (2011) 213:37.
Robinson TN, et al. Am J Surg (2011) epub Sept 2.*

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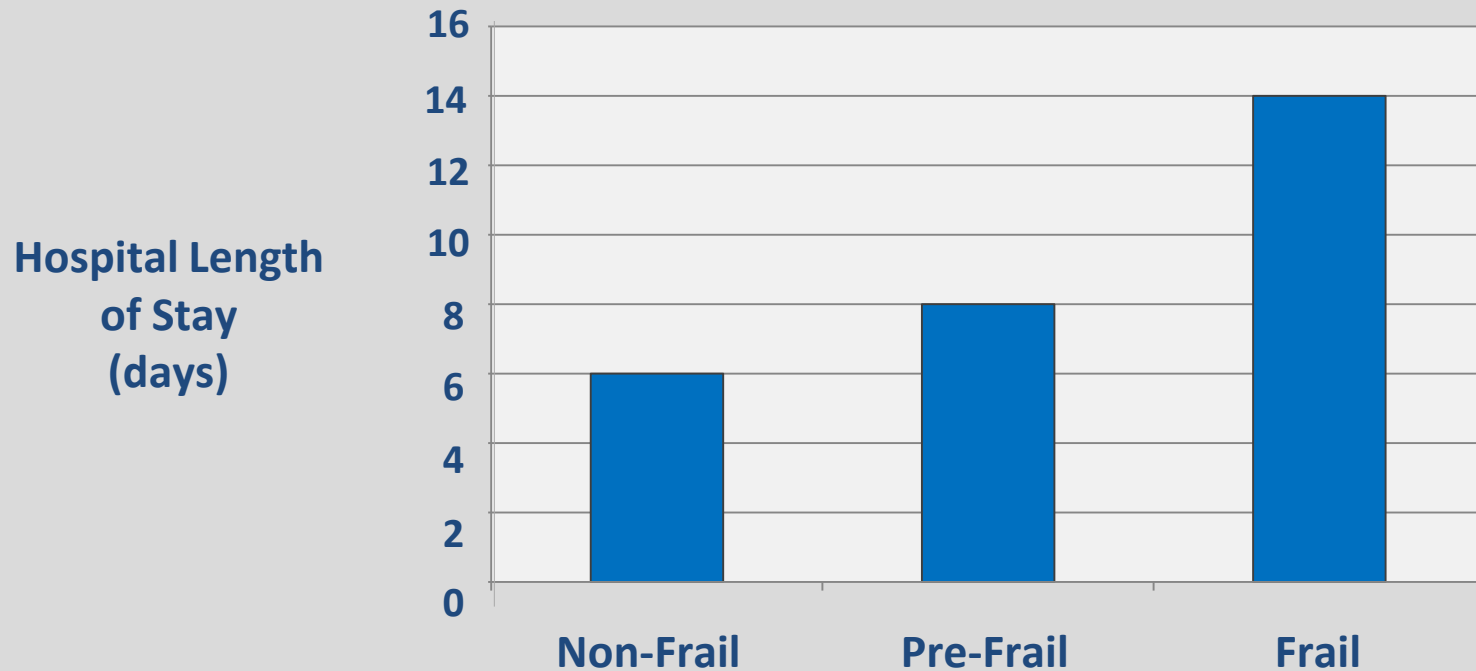
Operation

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Hospital Length of Stay



*Robinson TN, et al. Ann Surg (2009) 250:449.
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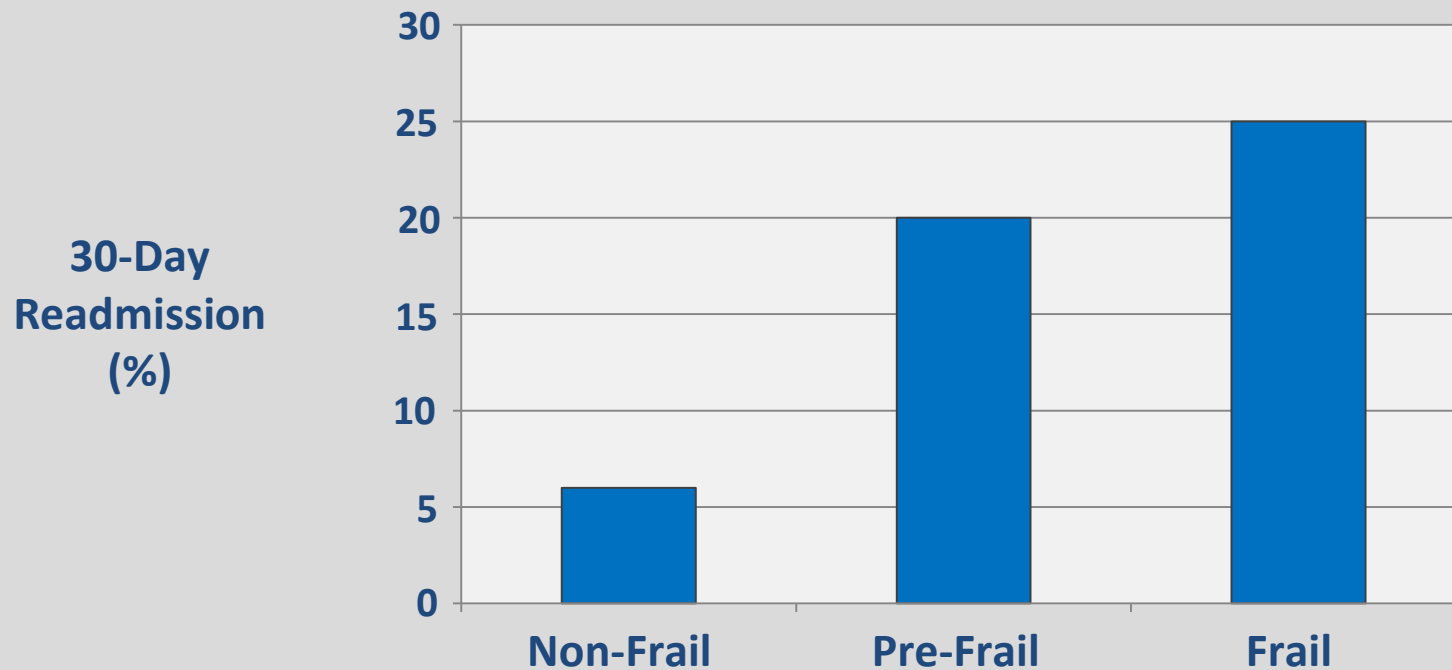
Operation

**Hospital
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Thirty-Day Readmission Rate



*Robinson TN, et al. Ann Surg (2009) 250:449.
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**Pre-Op
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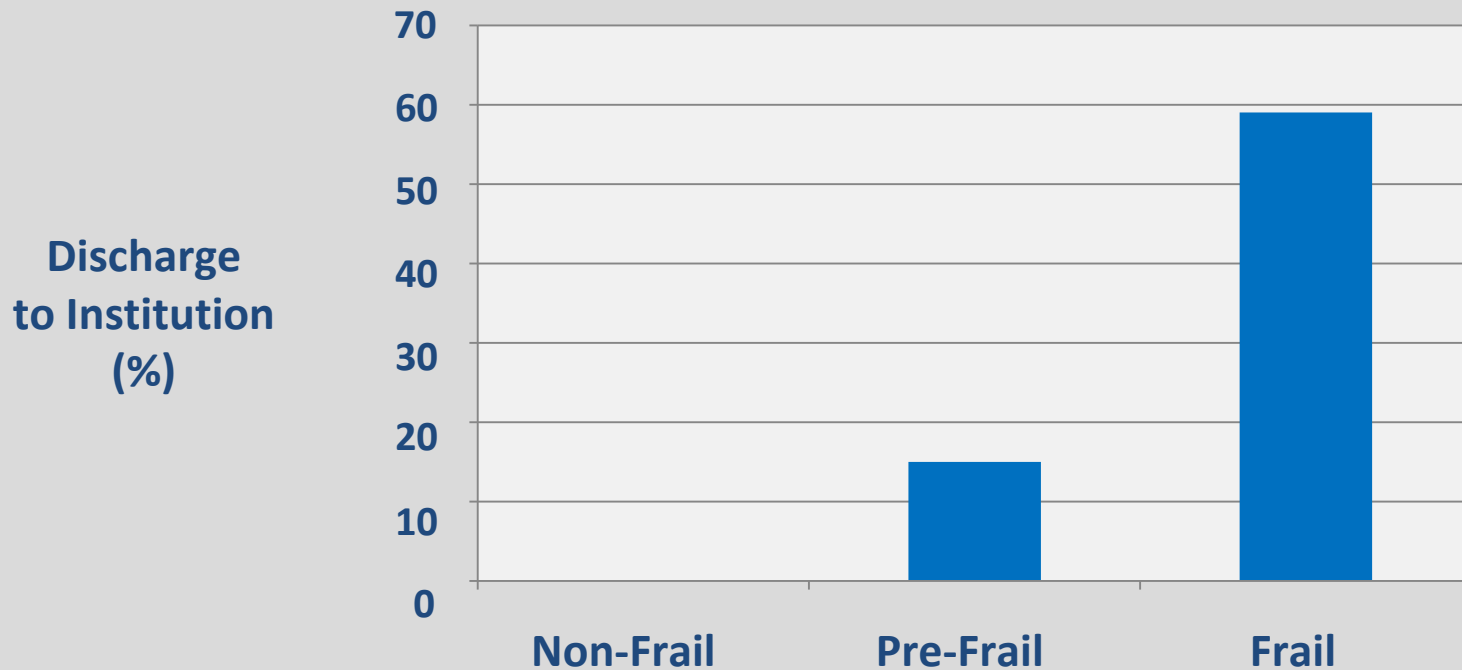
**Hospital
Course**

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Discharge to an Institutional Care Facility



Robinson TN, et al. Ann Surg (2009) 250:449.

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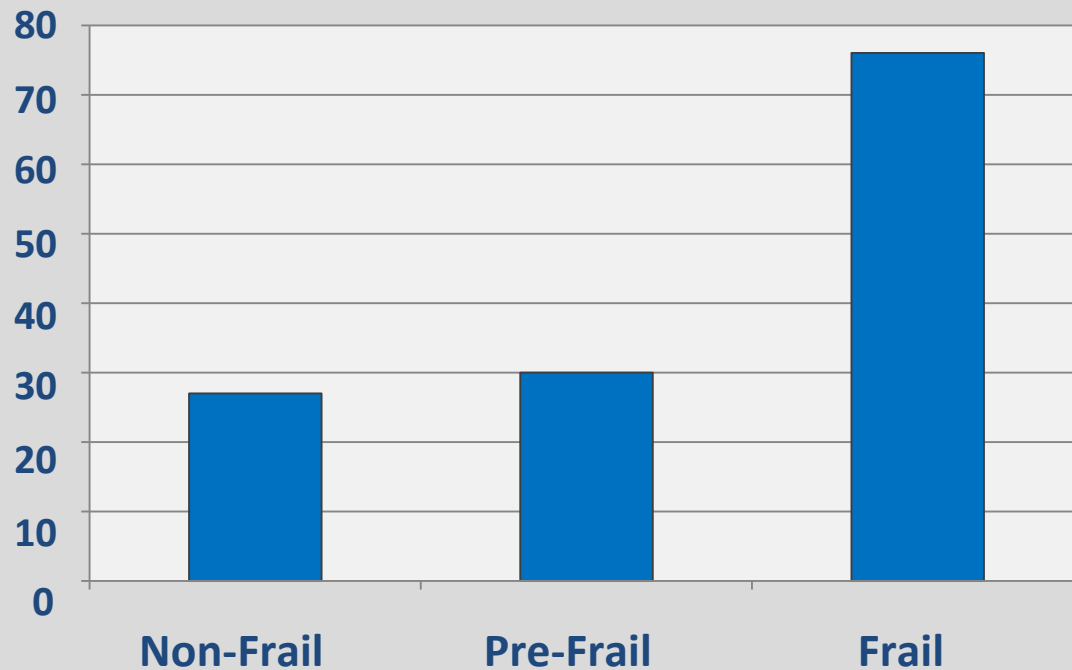
**Hospital
Course**

**30-Day
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**6-Month
Outcomes**

Cost of Hospitalization

**Hospital
Cost
(\$10K)**



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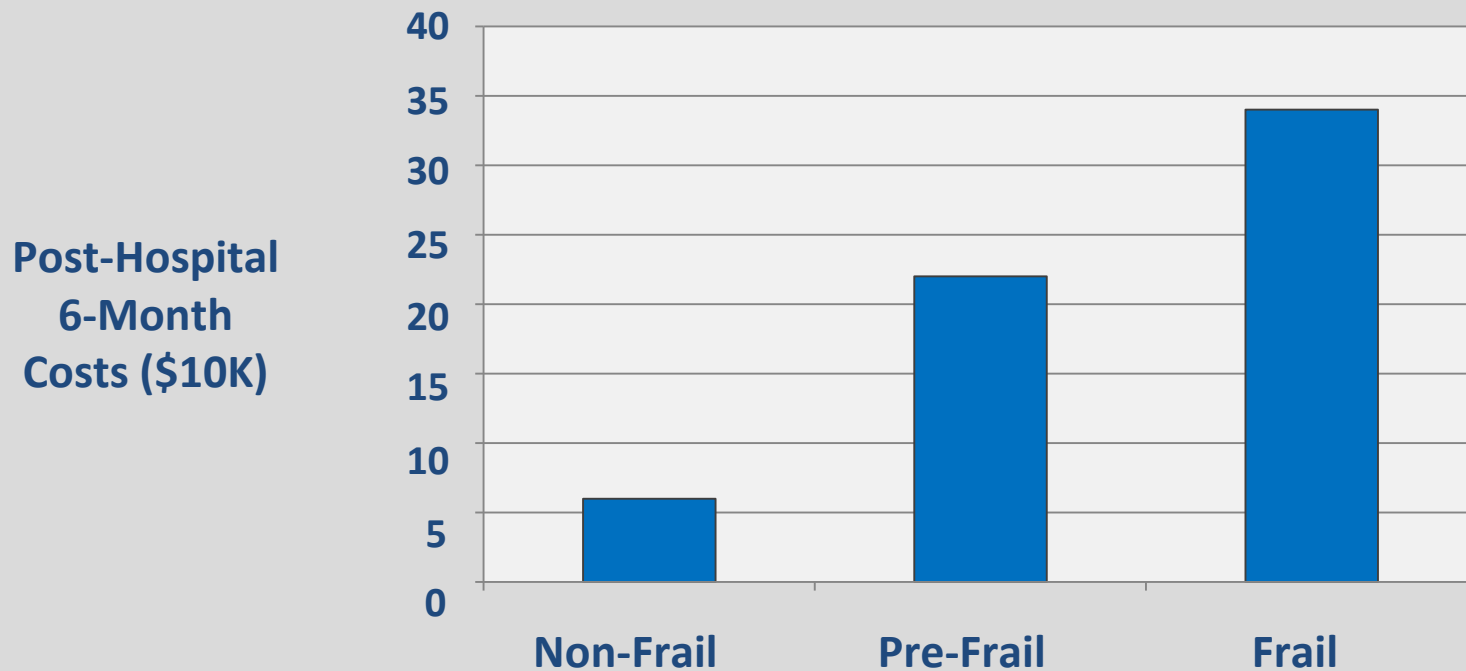
Operation

**Hospital
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**30-Day
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**6-Month
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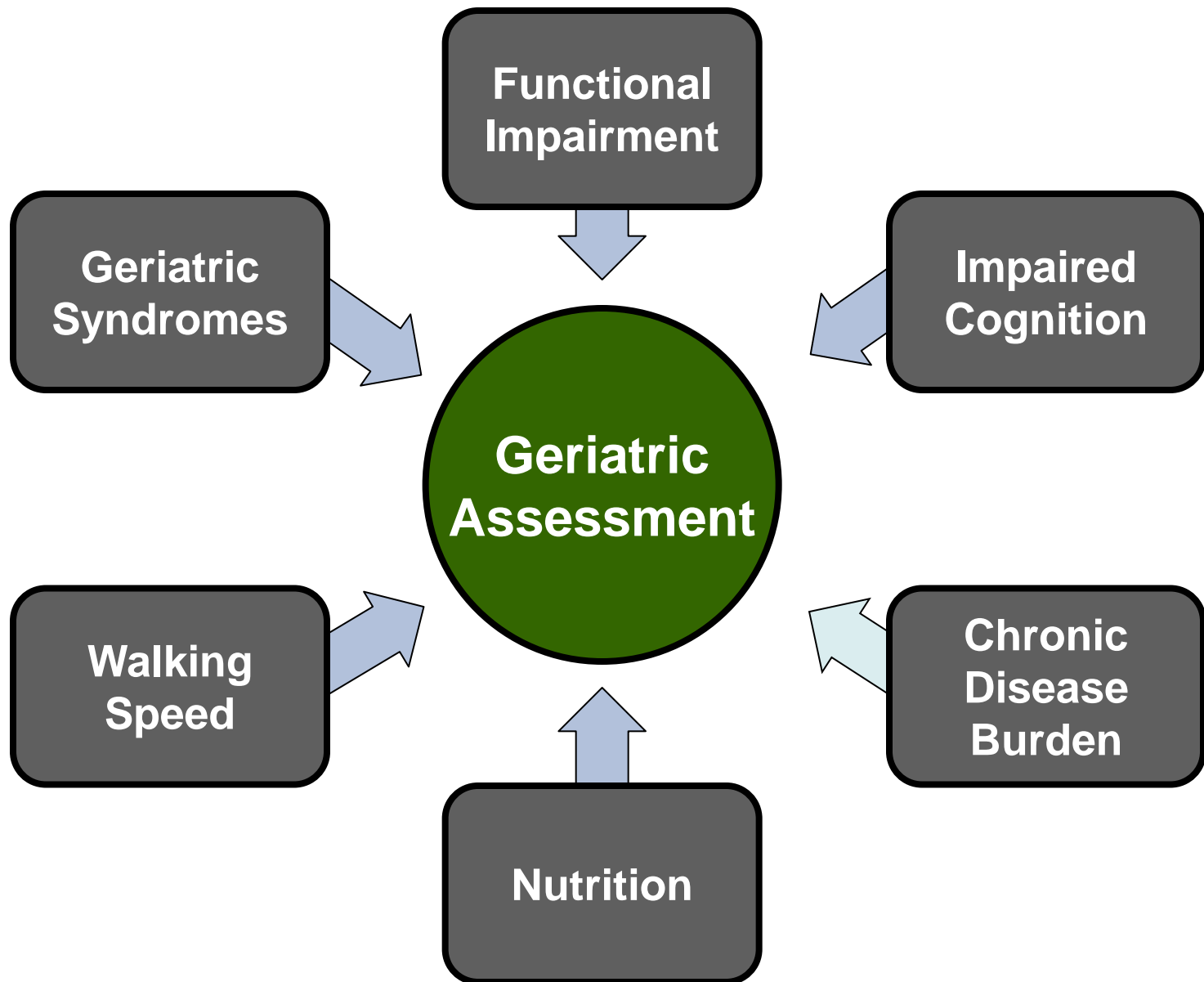
Post-Discharge to Six-Month Healthcare Costs

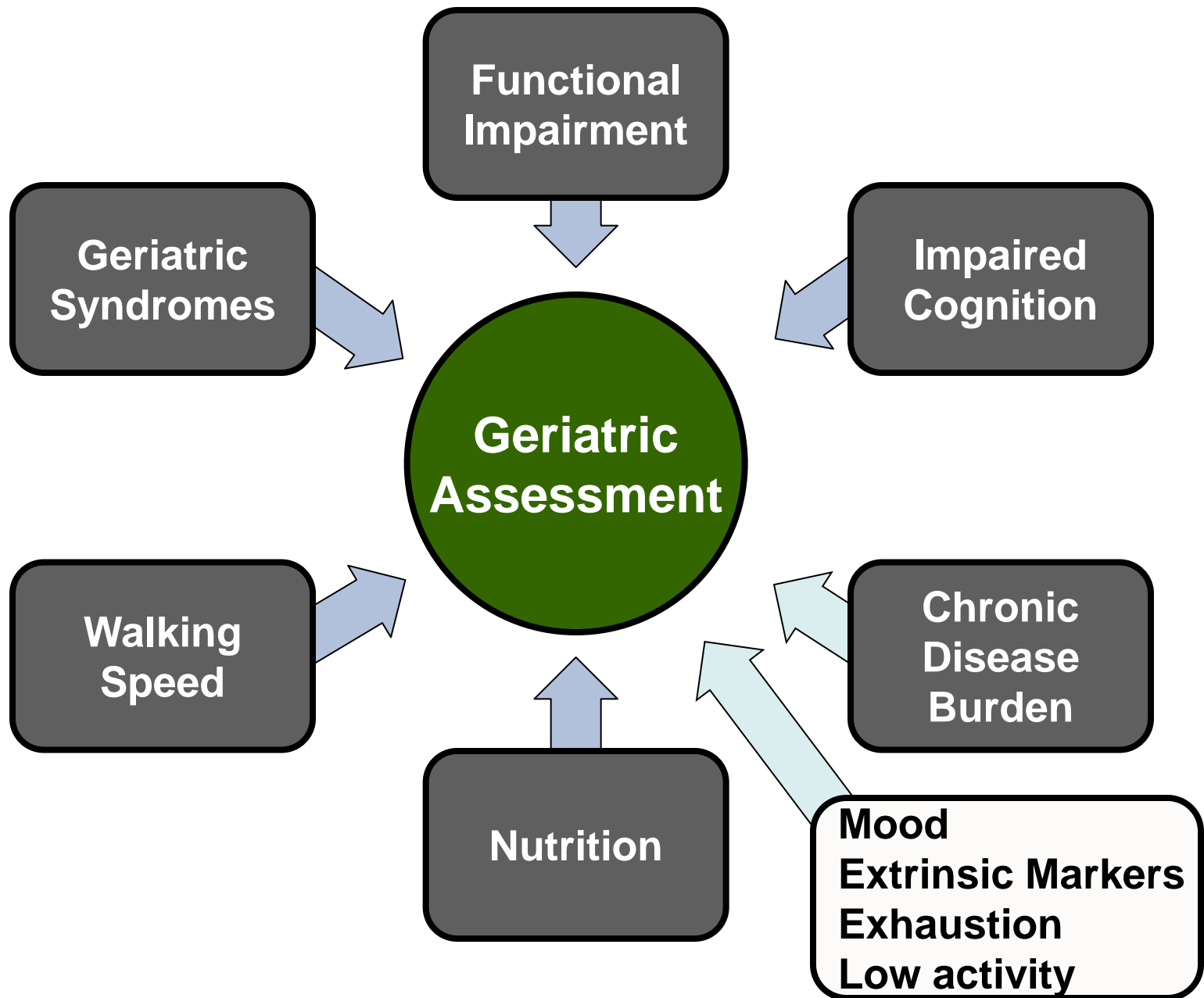


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Geriatric Assessment and Post-Op Outcomes

	Function	Cognition	Disease Burden	Nutrition	Walking Speed	Geriatric Syndrome
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Robinson et al (2009, '11)						
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Makary et al (2010)						
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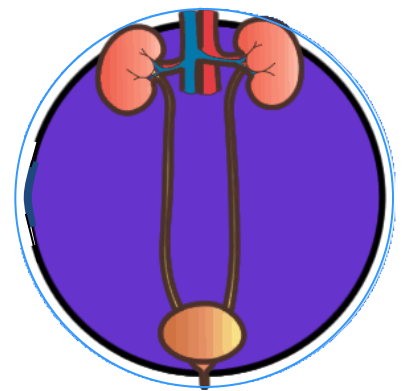
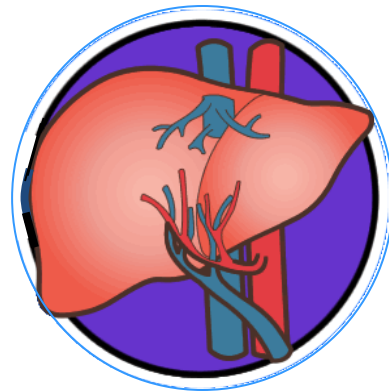
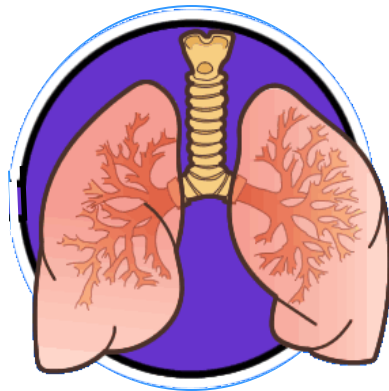
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Preoperative Assessment: What Really Matters





**Functional
Impairment**

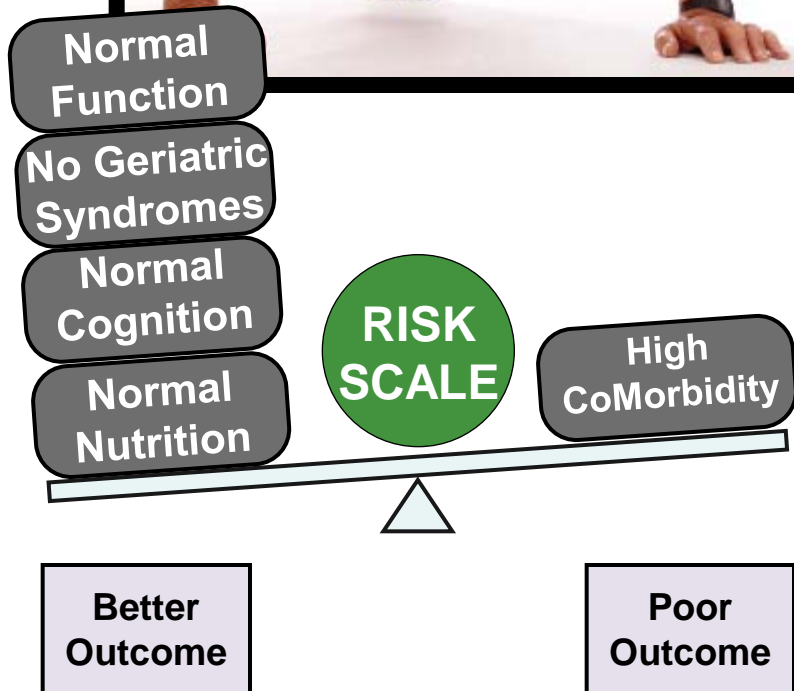
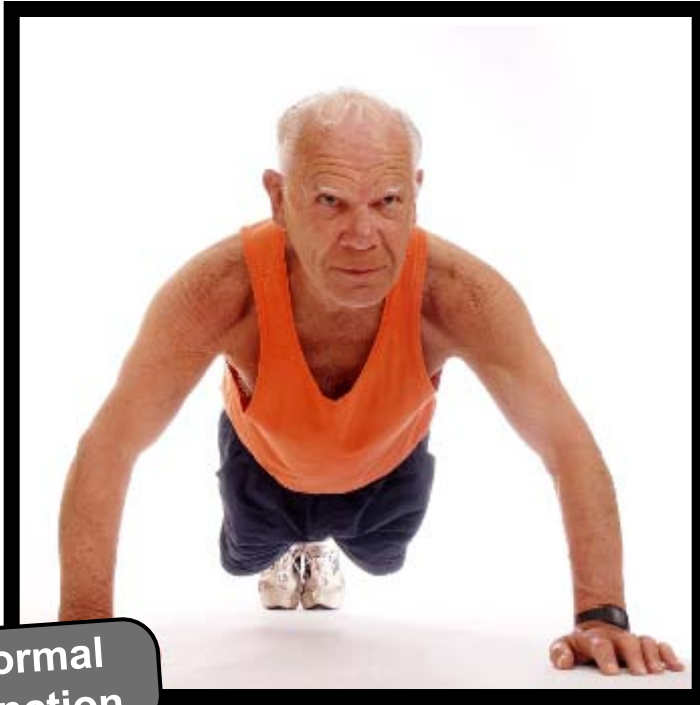
**Impaired
Cognition**

**Chronic
Disease
Burden**

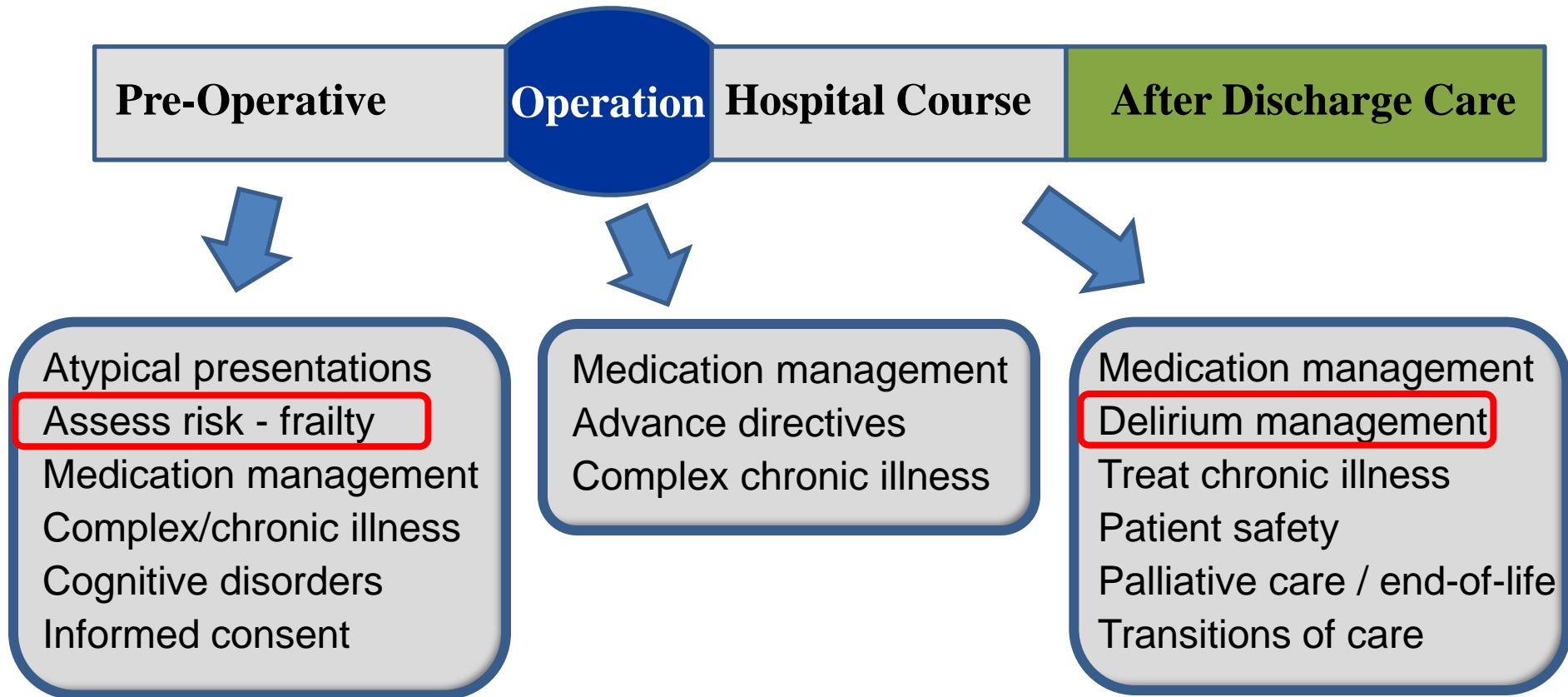
**Walking
Speed**

Nutrition

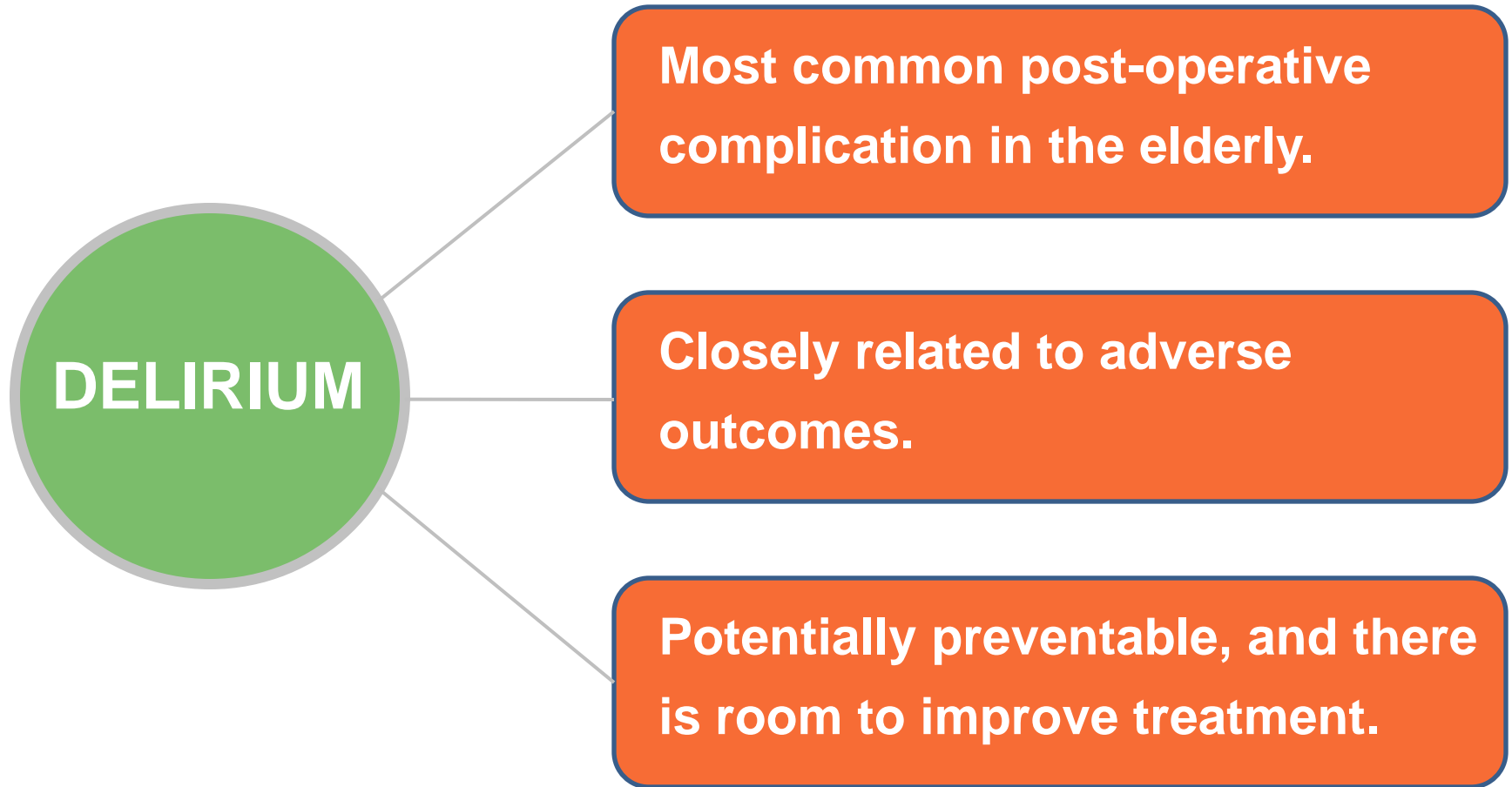
**Geriatric
Syndromes**



Proposed Competencies in Geriatric Patient Care for Use in Assessment for Initial and Continued Board Certification of Surgical Specialists



Why is delirium important?



What is Delirium?

Delirium is an acute, fluctuating change in mental status, with inattention and altered levels of consciousness.

Diagnostic Criteria for Delirium

- 1. Coexisting Physiologic Disturbance**
- 2. Acute Onset**
- 3. Disturbance of Consciousness**
- 4. Change in Cognition**

Diagnostic and Statistical Manual of Mental Disorders DSM IV - Fourth Edition (1994)

Incidence of Delirium

Cataract Surgery⁵	< 5%
Medical Ward¹	15%
Vascular Operation⁴	36%
Hip Fracture³	40%
DVAMC SICU⁶	44%
DHMC Trauma ICU⁷	59%
Medical ICU²	72%

¹NEJM (1999) 340(9):669.

²JAGS (2006) 54:479.

³JAGS (2002) 50:850

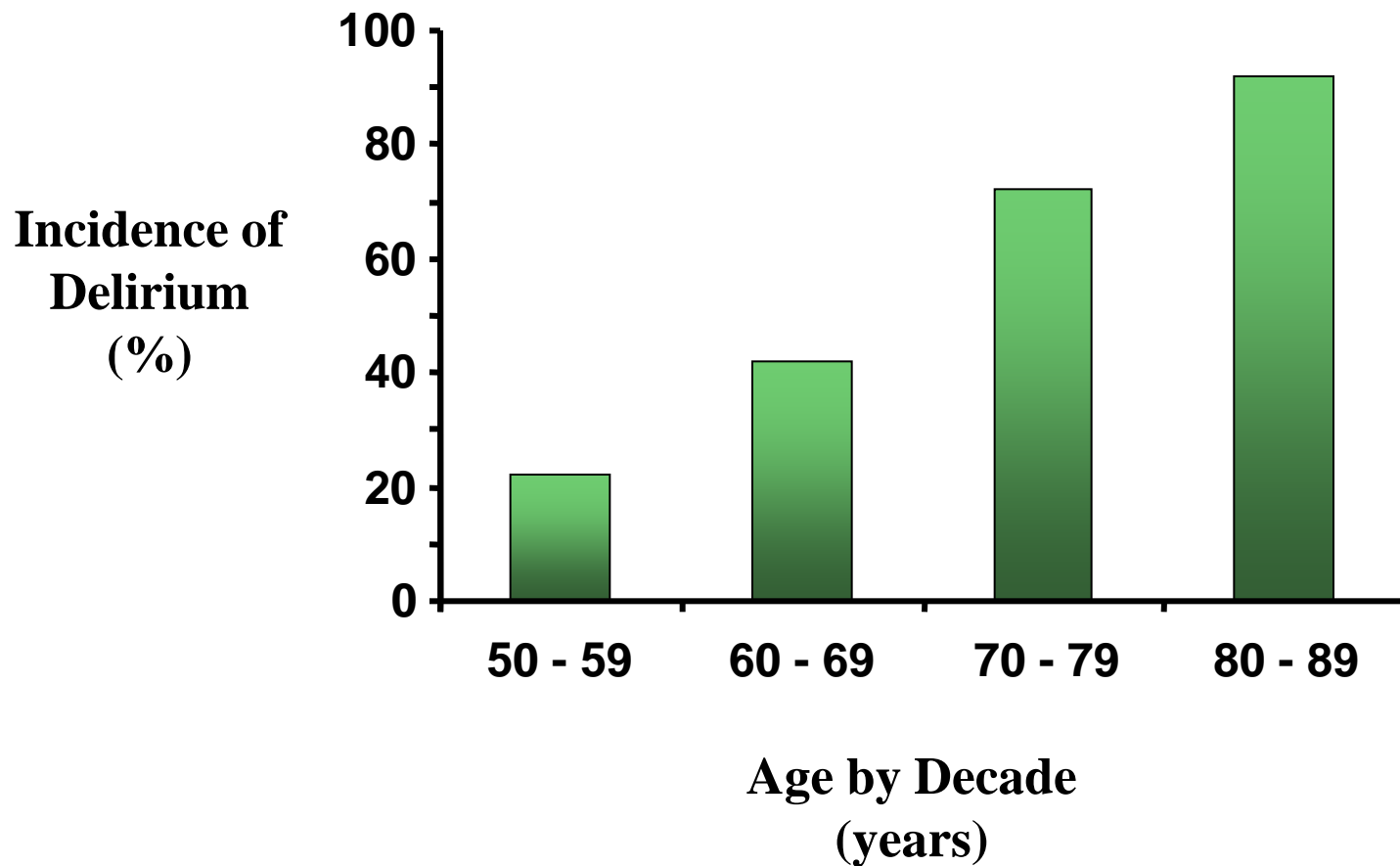
⁴Gen Hosp Psych (2002) 24:28.

⁵Int Psych (2002) 14:301.

⁶Ann Surg (2009) 249:173.

⁷Am J Surg (2008) 196:864.

Age and Post-Operative Delirium



Robinson TN et al. Ann Surg (2009) 249:173.

Pre-Operative Risk Factors

- ✓ **Impaired cognition**
- ✓ **Functional impairment**
- ✓ **High chronic disease burden**
- ✓ **Older age**
- ✓ **Low albumin**

Multifactorial Model of Delirium



Multifactorial Model of Delirium

**Predisposing Factors/
Vulnerability**



**Precipitating Factors/
Insults**

High Risk

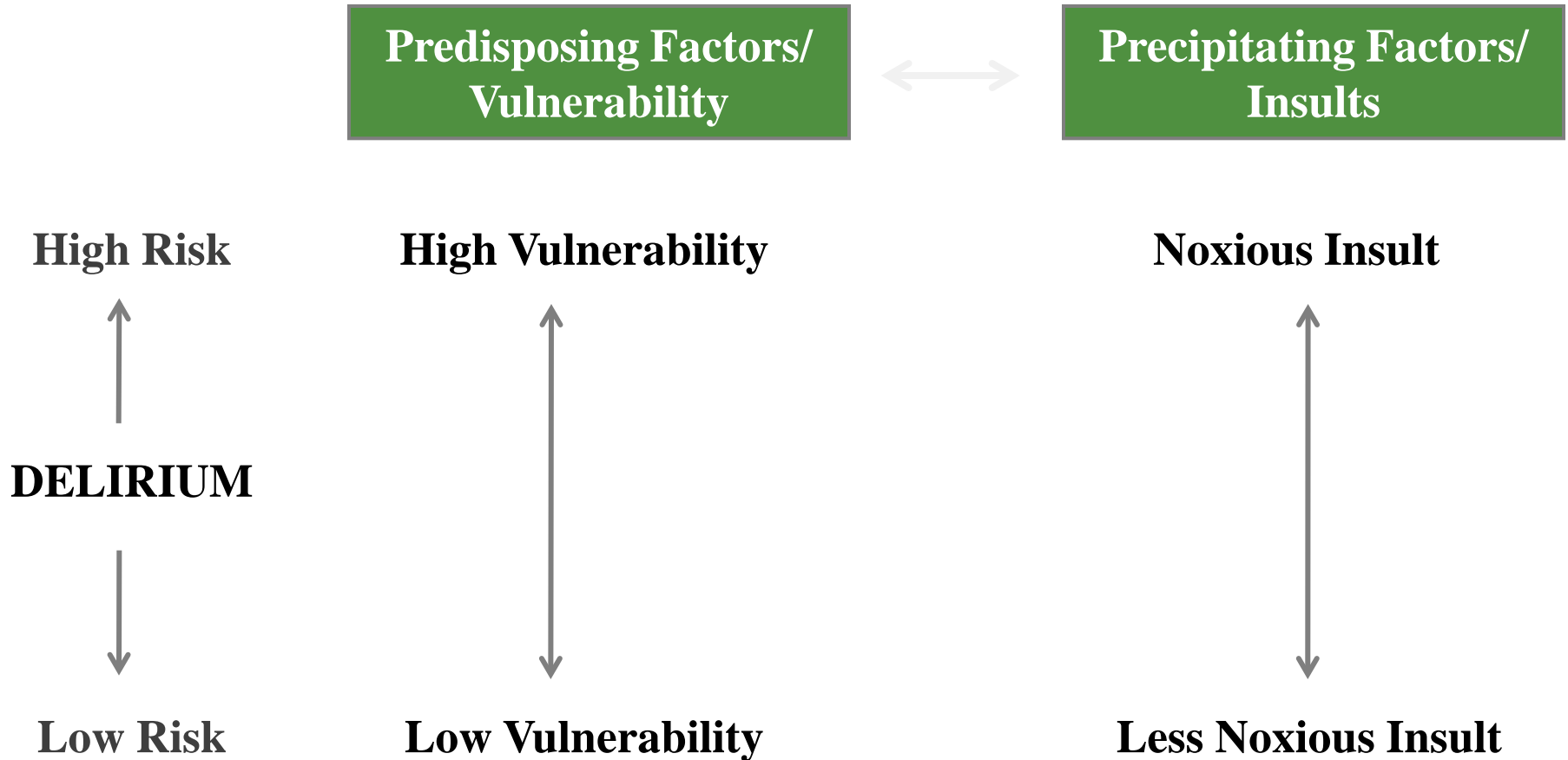


DELIRIUM

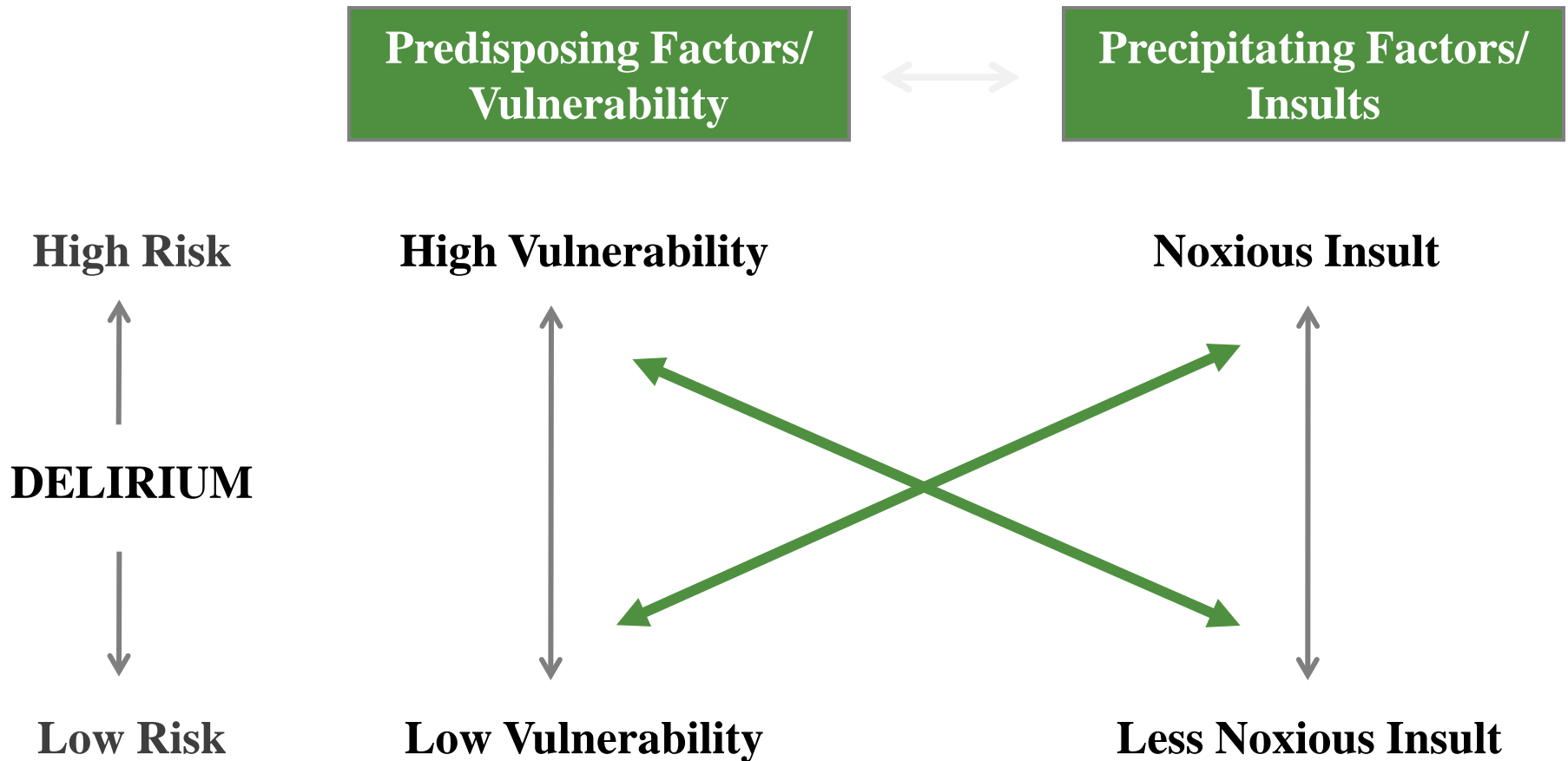


Low Risk

Multifactorial Model of Delirium



Multifactorial Model of Delirium



Risk Factors:

Older age

Dementia

Functional

Impairment

Co-Morbidities

Malnutrition



OPERATION



**POST-OP
DELIRIUM**

Risk Factors:

Older age

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OPERATION



**POST-OP
DELIRIUM**



**Evaluation for an
Identifiable Cause:**

Treat Identifiable Cause

- ✓ **Sepsis**
- ✓ **Hypoxemia**
- ✓ **Hypoglycemia**
- ✓ **Electrolyte Abnormality**
- ✓ **Dehydration**
- ✓ **Stroke**
- ✓ **Medications**

Medical Evaluation of Delirium

H&P Evaluation

- ✓ **Mental Status**
- ✓ **Neuro Exam**
- ✓ **Substance Abuse**
- ✓ **Medications**
- ✓ **Vital Signs**

Laboratory Tests

- ✓ **CBC**
- ✓ **Glucose**
- ✓ **Electrolytes**
- ✓ **BUN / Cr**
- ✓ **UA**
- ✓ **O₂ Saturation**

Risk Factors:

Older age
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OPERATION



**POST-OP
DELIRIUM**



**Evaluation for an
Identifiable Cause:**

Electrolyte imbalance
Hypoglycemia
Hypoxemia
Sepsis
Substance Withdrawal
Review Medications

Risk Factors:

Older age
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Malnutrition



OPERATION



**POST-OP
DELIRIUM**



**Evaluation for an
Identifiable Cause:**

Electrolyte imbalance
Hypoglycemia
Hypoxemia
Sepsis
Substance Withdrawal
Review Medications



Identifiable Cause:
Treat Appropriately

Risk Factors:

Older age
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OPERATION



**POST-OP
DELIRIUM**



**Evaluation for an
Identifiable Cause:**

Electrolyte imbalance
Hypoglycemia
Hypoxemia
Sepsis
Substance Withdrawal
Review Medications



Identifiable Cause:
Treat Appropriately



**Multi-Component
Treatment Plan**

Risk Factors:

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**POST-OP
DELIRIUM**



**Evaluation for an
Identifiable Cause:**

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Review Medications



Identifiable Cause:
Treat Appropriately



Supportive Measures:



**Multi-Component
Treatment Plan**

Preventing Delirium in the Hospitalized Elderly

- **Hypothesis**

Reducing the number of risk factors for delirium will prevent delirium in hospitalized elderly patients.

- **Methods**

- **852 hospitalized medical patients**
- **Older than 70 years**
- **Compare effectiveness of reducing the risk factors for delirium to standard of care**

Multi-Component Interventions To Prevent Delirium

Risk Factors

Cognitive Impairment

Sleep Deprivation

Immobility

Visual Impairment

Hearing Impairment

Dehydration

Intervention

Orientation protocol

Sleep enhancement

Early mobilization

Early vision correction

Hearing protocol

Change BUN/Cr ratio

Preventing Delirium in the Hospitalized Elderly

STUDY GROUP

	Intervention	Usual Care	p value
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Incidence Delirium	9.9%	15.0%	p=0.02
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Total Days Delirium	105	161	p=0.02
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Episodes of Delirium	62	90	p=0.03
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OPERATION



**POST-OP
DELIRIUM**



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Identifiable Cause:
Treat Appropriately



Supportive Measures:

Re-Orientation
Sleep Enhancement
Vision/Hearing Protocol
Remove Foley
Medication Choices



**Multi-Component
Treatment Plan**

Risk Factors:

Older age
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**Screen High Risk
Patients in Pre-
Operative Clinic**



Supportive Measures:

Re-Orientation
Sleep Enhancement
Vision/Hearing Protocol
Remove Foley
Medication Choices



OPERATION



**POST-OP
DELIRIUM**



**Evaluation for an
Identifiable Cause:**

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Identifiable Cause:
Treat Appropriately



**Multi-Component
Treatment Plan**



Risk Factors:
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**Screen High Risk
Patients in Pre-
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Supportive Measures:
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OPERATION



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DELIRIUM**



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Identifiable Cause:
Treat Appropriately



**Multi-Component
Treatment Plan**



Pharmacologic Treatment:

Pharmacologic Treatment - ICU

**Haldoperidol 2 mg q20 min
(while agitation persists)**

OR

Degree of Agitation	Initial Dose Haldoperidol <i>PO, IM or IV</i>
Mild	0.25-2mg
Moderate	2-4mg
Severe	4-8mg

Pharmacologic Treatment - ICU

Maintenance Dose:

- ✓ **50% of total loading dose is the maintenance dose divided every 6-8 hours daily**
- ✓ **Continue maintenance dose for 24-48 hours before tapering**

Taper:

- ✓ **Taper maintenance dose by 20-30% daily until off.**

Pharmacologic Treatment - ICU

Haldoperidol Administration

Control	Moderate Agitation 2:00AM – 2mg IV 2:30AM – 2mg IV 3:00AM – 2mg IV 3:30AM – Agitation controlled
Maintain	Order 1mg TID IV or PO x 24 hrs. Keep daily dose for 24 – 48 hrs.
Taper	0.5mg PO BID for 24 hrs. then DC

Pharmacologic Treatment - Ward

General Recommendation:

Haldoperidol 1-2 mg q2-4 hrs PRN

May be administered PO/IM/IV

For Elderly Patients:

Haldoperidol 0.25-0.5mg q4hrs PRN

*Practice Guideline for Treatment of Patients with
Delirium (1999) American Psychiatric Association*

Risk Factors:

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**Screen High Risk
Patients in Pre-
Operative Clinic**

**Supportive Measures:**

Re-Orientation
Sleep Enhancement
Vision/Hearing Protocol
Remove Foley
Medication Choices



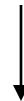
OPERATION



**POST-OP
DELIRIUM**

**Evaluation for an
Identifiable Cause:**

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Review Medications



Identifiable Cause:
Treat Appropriately



**Multi-Component
Treatment Plan**

**Pharmacologic Treatment:**

1. ICU
Haldoperidol 1-2mg IV
Repeat every 20 min until
resolution of agitation
Taper over several days
2. Surgical Ward
Haldoperidol 1mg PO/IM/IV
Maintenance dose 0.25-0.5mg
Q4hrs
Taper over several days