

Overview of Geriatric Medicine

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شعار سال ۲۰۲۵:

«شروعی سالم، آینده‌ای امیدبخش»

- روزشمار هفته گرامیداشت سالمندان
- سه‌شنبه ۸ مهر: سالمند و منزلت اجتماعی.
- چهارشنبه ۹ مهر: سالمند و سلامت جسمی.
- پنجشنبه ۱۰ مهر: سالمند و سلامت روان.
- جمعه ۱۱ مهر: سالمند و خانواده.
- شنبه ۱۲ مهر: سالمند و مشارکت اجتماعی.
- یکشنبه ۱۳ مهر: سالمند و حمایت‌های اجتماعی.
- دوشنبه ۱۴ مهر: سالمند، معنویت و امید به زندگی.

Introduction to Aging

- A. Geriatric patients are defined as patients aged 65 and older.
- 1. Geriatric patients are complex patients with **multiple chronic conditions**.
- 2. Their **decreased physiologic reserves** place them at **greater risk for complications** from both disease and treatment than younger individuals.

Gerontology and geriatrics

- 1. Gerontology is the study of aging and the processes and phenomena associated with aging.
- ❖ Gerontology incorporates all facets of aging, as **biology**, **sociology**, economics, history, and medicine.
- 2. Geriatrics is the study of **clinical practice** as it relates to older individuals.
- ❖ It includes the **diagnosis and treatment of diseases** and health problems of older adults.

What is aging?

- 1. Aging is the **inevitable chronologic** changes from year to year.
- ❖ It can be defined from both **biologic** and **psychosocial** perspectives.
- 2. Biologic aging involves changes at the **molecular, cellular, and organ levels**.
- ❖ Starting at about **age 30**, aging in humans results in an internal **physiologic** deterioration.
- 3. Cellular senescence is the process by which a cell loses its ability to **divide, grow, and function**, ultimately leading to cell death.

What is aging?

- ❑ Aging can be characterized by the acronym **CUPID**
- ❖ **Cumulative**: means the effects of aging are irreversible and accumulate over time.
- ❖ **Universal**: All humans age, making this phenomenon universal.
- ❖ **Progressive**: Aging is **unidirectional**. For example, a postmenopausal woman cannot become ovulatory again.
- ❖ **Intrinsic**: Because even under the best environmental conditions an individual ages, aging is **intrinsic** to the organism.
- ❖ **Deleterious**: means that aging is harmful, resulting in decreased vitality and an increased vulnerability to disease and environmental stresses.

Biologic theories of aging

- 1. Biologic aging impairs an organism's ability to maintain homeostasis.
- ❖ Homeostasis is ability of an organism or cell to regulate its internal conditions through a **system of feedback** controls that **preserves function** in the face of external stresses.
- 2. The loss of physiologic reserve makes older individuals more vulnerable to disease and environmental stresses.

Biologic theories of aging

- 3. A common rule of aging is that individuals lose about **1% of their physiologic reserve per year**, starting at around **age 30**.
- This is mostly true for the **pulmonary, renal, cardiovascular, and musculoskeletal** systems.

Biologic theories of aging

- 4. **Heterogeneity** is another key concept of aging.
 - ❖ There is an increase in variability from **individual to individual** and also within an **individual's organ systems**.
 - ❖ For example, someone might have good pulmonary function, yet have poor renal function.
- 5. **Successful aging** can be thought of as maintaining **good health**, good **functional** ability, good **cognition**, and remaining **socially engaged**.

Demographic s and Epidemiology

❖ Three life-stage subgroups:

➤ **Young-old** (65–74),

➤ **Middle-old** (ages 75–84),

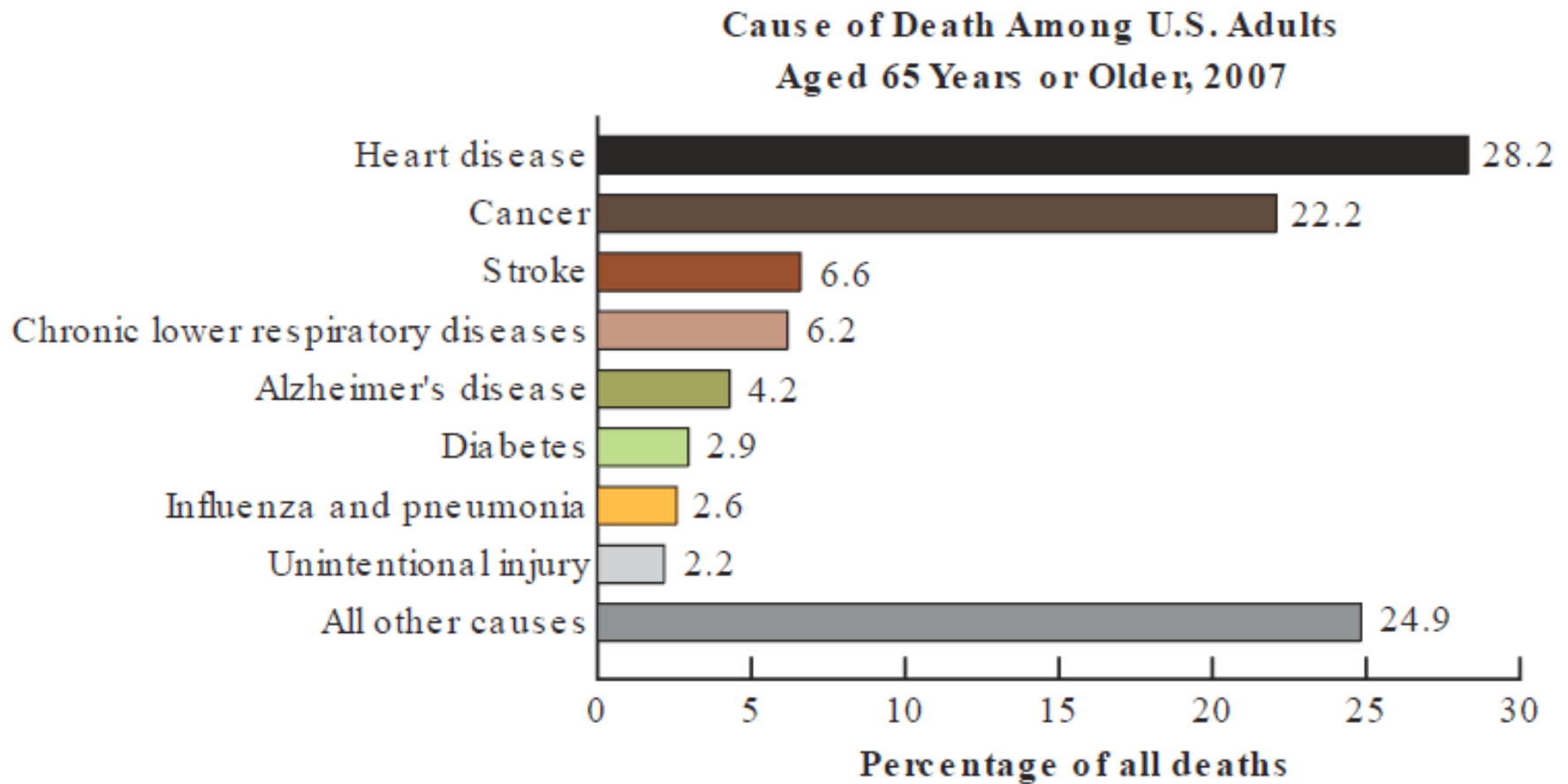
➤ **Old-old** (over age 85)

- The oldest-old are sometimes referred to as the **frail** elderly.
- ✓ Each group of elderly has different needs and services, and programs should be tailored to the needs of each group.
- ✓ The young-old need programs and services that reintegrate them into **meaningful roles and activities** after retirement, whereas the older-old need **supportive and protective programs**.

Causes of death and chronic disease

1. At the turn of the century, the leading causes of death were pneumonia, influenza, and tuberculosis.
 2. Over the past century there has been a **shift** in the causes of death from acute infectious diseases to **chronic diseases**.
- ❖ Now the three leading causes are **heart disease, cancer, and stroke**, which combine to account for **almost 60%** of all deaths among those aged 65 and older.

Causes of death and chronic disease



Changes of Aging

A. Aging and disease are not synonymous.

B. Most geriatricians do not view aging as a disease, **because aging is a natural process**

✓ and, unlike disease, aging is universal.

Changes of Aging

C. Aging is a diverse process, in that it differs not only from individual to individual but also among the organ systems of an individual.

1. **Biologic** aging and **chronologic** age are not the same.

2. Aging alone generally does not cause **symptoms.**

Changes of Aging

D. Some changes previously attributed to aging are now thought to be related to lifestyle variables.

1. Genetic make up may only account for 25% of the variability in human longevity, with much of our health and well-being determined by **environmental factors**.

2. Aging may be slowed to some extent by maintaining a **healthy diet, exercising**, and engaging in other **healthy lifestyle habits**.

Changes of Aging

E. The major age-related biologic change is a diminished reserve capacity and the inability to maintain homeostasis in the face of stressors such as a disease or adverse environmental factors such as excessive heat.

2. Age-related changes are most pronounced in the **oldest-old, e.g., those aged over 85.**

3. Sometimes it may be difficult to distinguish normal aging from pathology.

✓ For example, the anatomic changes of plaques and neurofibrillary tangles seen in those with Alzheimer disease may also be seen in normal individuals, although usually not to the same degree.

Changes of Aging

F. A diminished physiologic reserve makes older individuals more vulnerable to disease.

1. About 90% of older individuals have **at least one chronic disease**. Many may have multiple chronic conditions, making management more complex and challenging than in younger adults.
2. The lack of physiologic reserve may reach a point where even minor insults cannot be overcome, leading to **significant dysfunction** or even death.
 - ✓ The reverse is also true; minor improvements in health can lead to significant functional improvement.
3. Although there is usually little or no effect on daily activity, decline in physiologic reserve results in **greater morbidity and mortality** from illnesses among older individuals.

Changes of Aging

G. Biologic aging also affects illness in several other ways:

1. Diseases in the elderly are more likely to present atypically and nonspecifically.

- ✓ A heart attack may present with **dizziness** rather than chest pain,
- ✓ Urinary tract infection with **confusion** rather than flank pain or dysuria,
- ✓ Depression without sadness,
- ✓ Infection without fever,
- ✓ Congestive heart failure without shortness of breath.

2. Symptoms in one organ system may represent pathology in another.

- ✓ A heart attack may present with nausea without chest pain,
- ✓ Pneumonia with confusion,
- ✓ Urinary tract infection with a fall.

Changes of Aging

3. Older individuals may underreport disease by attributing symptoms to aging.

- ❖ A patient may attribute a symptom to aging and may not seek out a healthcare provider.
- ❖ Physicians, in turn, may mistakenly attribute a symptom to aging and may miss a significant potentially reversible problem.

Physiologic Changes of Aging

- Although the sequence of aging changes is similar, a fundamental principle is that the rate of physical change tends to be quite individual.
- The physiologic aging an individual experiences depends on genetics, lifestyle choices, and environmental factors.
- Changes from disease and lifestyle choices are not considered a part of normal aging.

A. Changes in body composition

TABLE 1-3

Body Composition Changes with Aging

Changes in Body Composition

Clinical Impact

Decreased lean body mass

Changes in drug distribution

Decreased muscle and bone mass

Decreased strength

Decreased total body water

Greater risk of falls

Increased percent of body fat (until around 70, then decreases)

Greater risk of fracture

Greater risk of dehydration

A. Changes in body composition

- ❖ On average, individuals lose about 5 cm in height by age 80.
- ❖ A variety of factors contribute to the loss of height.
 - ✓ Changes in posture
 - ✓ Vertebral compression
 - ✓ Compression of intervertebral discs
 - ✓ Increased curvature of the hips and knees
 - ✓ Decreased lower extremity joint spaces
 - ✓ Flattening of the feet
- ❖ usually do not cause health-related problems.

A. Changes in body composition

- ❖ The percent of body water (TBW) decreases with aging.
- ✓ Decreased TBW places older individuals at greater risk for **dehydration**.
- ✓ Changes in body composition and body water **affect drug distribution**.

B. Dermatologic changes

- Aging skin is more prone to **injury** and **slower to heal**.
- The activity of the enzyme that synthesizes **vitamin D** decreases with age.
- Seniors may develop persistent areas of **ecchymosis** without a history of trauma, also known as **senile purpura**.
- Common foot problems in the elderly include bunions, calluses and corns, hammertoes, and heel pain.

C. Musculoskeletal system

1. Muscle strength and endurance decrease with age.

- ❖ Training slows muscle loss and can increase strength, even in very old age.

2. Sarcopenia is the loss of muscle mass and contractile strength that occurs with age.

- ❖ Exactly how much muscle loss is due to aging versus disuse is unclear. For example, a highly fit 65-year-old may outperform a 30-year-old couch potato.
- ❖ Sarcopenia is associated with increased fatigue, frailty, or an increased risk of falling and can compromise the function of an older adult.

C. Musculoskeletal system

- 3. The respiratory muscles and rib cage are also affected by aging, decreasing the efficiency of breathing.
- 4. Alterations in muscle function in the gastrointestinal tract and urinary tract increase the risk of constipation and bladder dysfunction.

C. Musculoskeletal system

5. Bone loss is a universal aspect of aging, starting in the 30s.

- The degree of bone loss occurs at a highly individual rate and is influenced by **diet, exercise, and lifestyle**.
- ❖ Aging affects the osteoblasts, which make bone, to a greater degree than the osteoclasts, which break down bone.
- ❖ Although age-associated, **osteoporosis** is a **disease state** and is not considered a normal part of aging.

C. Musculoskeletal system

- 6. With aging there is decreased **water** content in cartilage and more cross-linking in the collagen fibers, **which impacts the ability of the cartilage to cushion pressure on the bones.**
- ❖ a. Changes in cartilage are the underlying causes for **osteoarthritis.**
- ❖ b. There are also similar changes in the tendons and ligament, which can contribute to **decreased flexibility and mobility** common to older adults.

D. Respiratory system

1. The respiratory system may be the system at greatest risk from **environmental damage**.
2. Respiratory system changes include:
 - ❖ Weakened respiratory muscles and a stiffer chest wall **reduce effective ventilation**.
 - ❖ The cough reflex blunts with age, impairing effective coughing.

E. Gastrointestinal system

- 1. Aging of the gastrointestinal system causes **fewer serious problems** than most other organ systems.
- 2. Older individuals make **less saliva** and more frequently complain of a **dry mouth** than younger individuals.
- ❖ Complaints of dry mouth may be related to **medication or nutrition effects** rather than aging.

E. Gastrointestinal system

- ❑ Although liver function is fairly well preserved with age—the liver becomes less efficient in eliminating drugs.
- ❖ Older individuals are at greater risk of **constipation**.
- ❖ Transit time is influenced by lifestyle, e.g., taking **sufficient fluids**, consuming adequate **fiber**, and **being physically active**.

F. Urinary system

- 1. The kidneys become smaller with age, and there is about a 20% to 30% change in size by age 90.
- ❖ Consequently the aging kidney cannot adapt as efficiently to **fluid overload or dehydration**.

F. Urinary system

- The bladder, ureter, and urethra are muscular structures that tend to lose tone and elasticity with age.
- ❖ The loss of muscle tone may lead to **incomplete emptying of the bladder** and a greater risk of infections.
- ❖ **Prostate enlargement** may contribute to incomplete bladder emptying in men.
- **Bladder capacity may decline** from about 350 to 500 cc to about 200 to 300 cc in older age.
- ❖ This causes the need for more frequent urination as individuals age.

G. Cardiovascular system

- 1. Anatomical changes include the following:
 - ❖ Blood vessels become thicker and less elastic, impairing their ability to expand and contract.
 - It is unclear whether atherosclerosis is an age-related or age-associated disease.
 - Lifestyle influences such as **smoking, diet, and exercise** are a major factor in how well the blood vessels age.
 - One argument that atherosclerosis is not a normal part of aging is that in some primitive cultures adults typically do not develop atherosclerosis.

G. Cardiovascular system

- ❖ Aging is strongly associated with heart disease, but it is not certain what occurs in the absence of disease.
- ✓ Blood vessels become thicker and less elastic, impairing their ability to expand and contract.
- ✓ Systolic blood pressure may increase with loss of arterial distensibility.
- Age-related anatomical changes make arrhythmias more common in older adults.



A



B

TABLE 1-6

Principle Changes in the Cardiovascular System

Increased stiffness of the blood vessels
Increased stiffness of the myocardium
Decreased β -adrenergic response
Impaired SA node function
Impaired endothelial cell function
Overall reduction in cardiovascular reserve

H. Nervous system

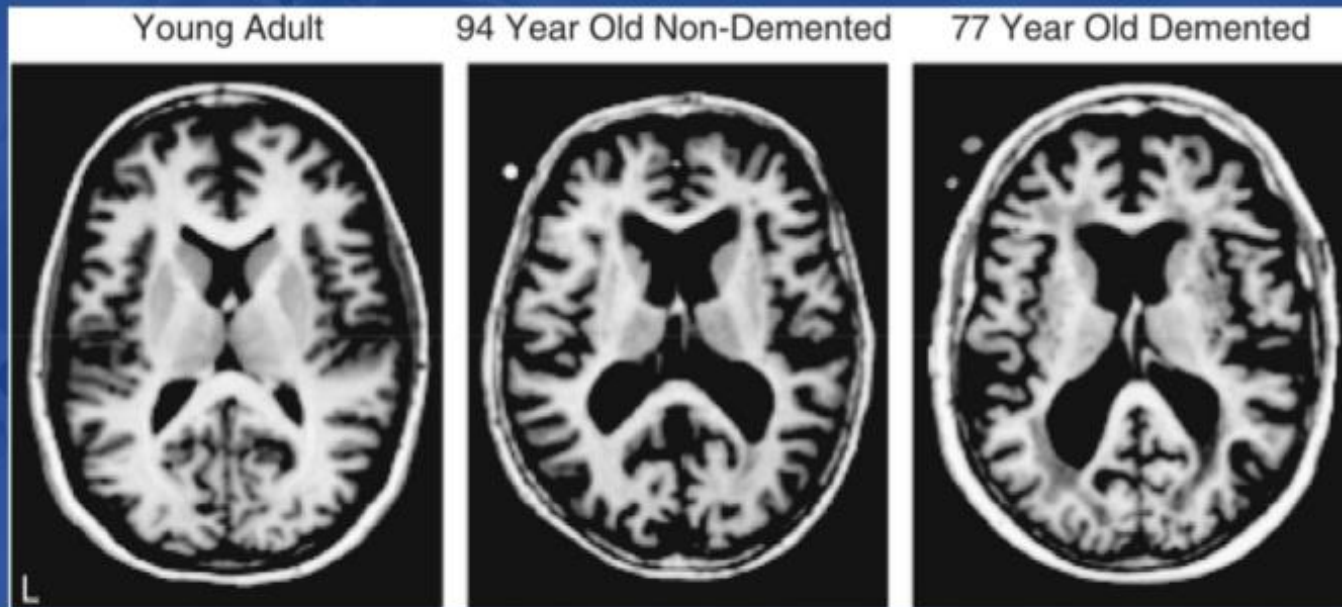
- ✓ The brain loses volume with aging. Gray matter is affected more than white matter.
- ✓ Normal aging results in plaques and tangles like those seen in AD, although not to the same degree.
- ❖ Short-term memory and the ability to learn new information may diminish with age, but in the absence of disease, intellectual performance is usually maintained until late in life.
- ❖ Reaction time and performance of tasks slow with age because the nerve impulses transmit more slowly

TABLE 1-7

CNS Changes

CNS Changes	Clinical Impact
Decrease brain mass	Atrophy on CT or MRI scans
Decreased dopamine receptors	Tendency toward parkinsonism—gait changes
Increase parasympathetic response	Sensitivity to anticholinergic drugs
Slower reflexes	Tendency to fall
Decrease in acetylcholine	Diminished reflexes on exam
	Poorer two-touch discrimination

The Aging Brain



H. Nervous system

- ❖ Sleep patterns change with age with more time spent in lighter states of sleep and less time in deeper stages.
- ❖ As individuals age, there is a **loss in the number of touch receptors** in the skin and a higher threshold to stimulate the remaining receptors.
- ❖ The response to painful stimuli and temperature decrease with age.
- ❖ Changes in touch may affect older individuals in subtle ways.
- ❖ For example, diminished sensation in the soles of the feet increase the **risk of falling**, or difficulty in assessing the amount of pressure to pick something up may lead to their **dropping more items** such as a glass or a fork.

I. Taste and smell

- Smell is far more affected by aging than taste.
- It may be that much of the changes in taste experienced by older individuals are related to changes in **smell** and local factor such as poor dentition.

TABLE 1-8

Impact of Taste Changes

Problems Related to Changes in Taste

Loss or increased appetite

Loss because of no taste

Increased intake to achieve some taste

Complaints about how food taste

Mistaken identity of food—cannot identify spoiled food

Excessive seasoning—increasing sugar, salt

J. Vision & Hearing

- Glare from lights at night may be a sign of cataracts or glaucoma. A loss of central vision suggests macular degeneration.
- **Presbycusis** is a general term used for the hearing loss in older individuals. It typically affects **higher frequencies** to a greater extent than lower frequencies.

L. Immune system

1. The efficiency of the immune system declines with age and is associated with an increased susceptibility to **infection**, reduced efficacy of vaccination, and an increased inflammation and level of inflammatory markers.

M. Endocrine system

- There is a progressive decline in carbohydrate tolerance and increasing insulin resistance.

General changes with aging

- Physiologic changes make older adults more **vulnerable to periods of stress** such as extremes of temperature and dehydration.
- ❖ Conditions such as **malnutrition**, **hypothyroidism**, and **stroke** that are more common in elderly individuals also place older adults at risk for **hypothermia**.
- ❖ Extrinsic factors such as **poverty**, e.g., inability to afford air conditioning may be a contributing factor.

General changes with aging

- ✓ Older adults are also at great risk for **hyperthermia** due to decreased ability to vasodilate, a decline in sweat production and an impaired sense of temperature and thirst.
- ✓ Aging increases the risk of dehydration.

Clinical implications of the aging process

- The clinical setting should be **age-friendly** to foster good communication and an adequate evaluation.
- ❖ The exam room is **neither too hot nor cold**.
- ❖ The exam room should be **well lit** to compensate for visual changes.
- ❖ Many elderly have hearing deficits, and the examiner should face the speaker with their mouth at eye level, **speaking clearly**, but **not shouting**, and keeping extraneous noise to a minimum.
- ❖ Make sure individuals bring any **adaptive devices** they use such as **glasses, hearing aids, canes, walkers**

Clinical implications of the aging process

- ❖ Allow **adequate time**, and pace the interview to match the patient.
- ❖ If the patient is easily fatigued, it may be wise to **break the evaluation into multiple appointments**.
- ❖ Providing **comfortable chairs** with sturdy arms and a **back high enough** to provide back support and an **exam table** that is easy to get onto is important.
- Pillows are useful to provide neck and back support.

Clinical implications of the aging process

- ❖ Examination areas should be large enough to accommodate a walker or a wheel chair.
- ❖ Bathrooms should have wheel chair accessibility; grab bars, raised toilet seats, and an emergency button.
- ❖ It is important to remember that older patients should be treated with respect and care, but not as children.
- ❖ Calmness and patience are key factors for a successful healthcare encounter.

Clinical implications of the aging process

- Older patients frequently have chronic conditions such as arthritis that, if effectively managed, can improve their functional abilities and quality of life.
- In approaching the elderly patients, the clinician should keep in mind **those illnesses more common** among the elderly, especially those that are more potentially **treatable**.

frailty

- Aging-related syndrome of physiological decline, characterized by marked vulnerability to adverse health outcomes.
- Frail older patients often present with an increased burden of symptoms including **weakness and fatigue**, medical complexity, and **reduced tolerance to medical and surgical interventions**.

frailty

The physical frailty screening tool most often cited is often called the **Fried Frailty Tool**

- Weight loss (≥ 5 percent of body weight in last year)
- Exhaustion (positive response to questions regarding effort required for activity)
- Weakness (decreased grip strength)
- Slow walking speed (gait speed) (> 6 to 7 seconds to walk 15 feet)
- Decreased physical activity (Kcals spent per week: males expending < 383 Kcals and females < 270 Kcal)

PHYSICAL DIMENSION

Physical health
Unintentional weight loss
Walking problems
Balance problems
Poor hearing
Poor vision
Low hand strength
Physical tiredness

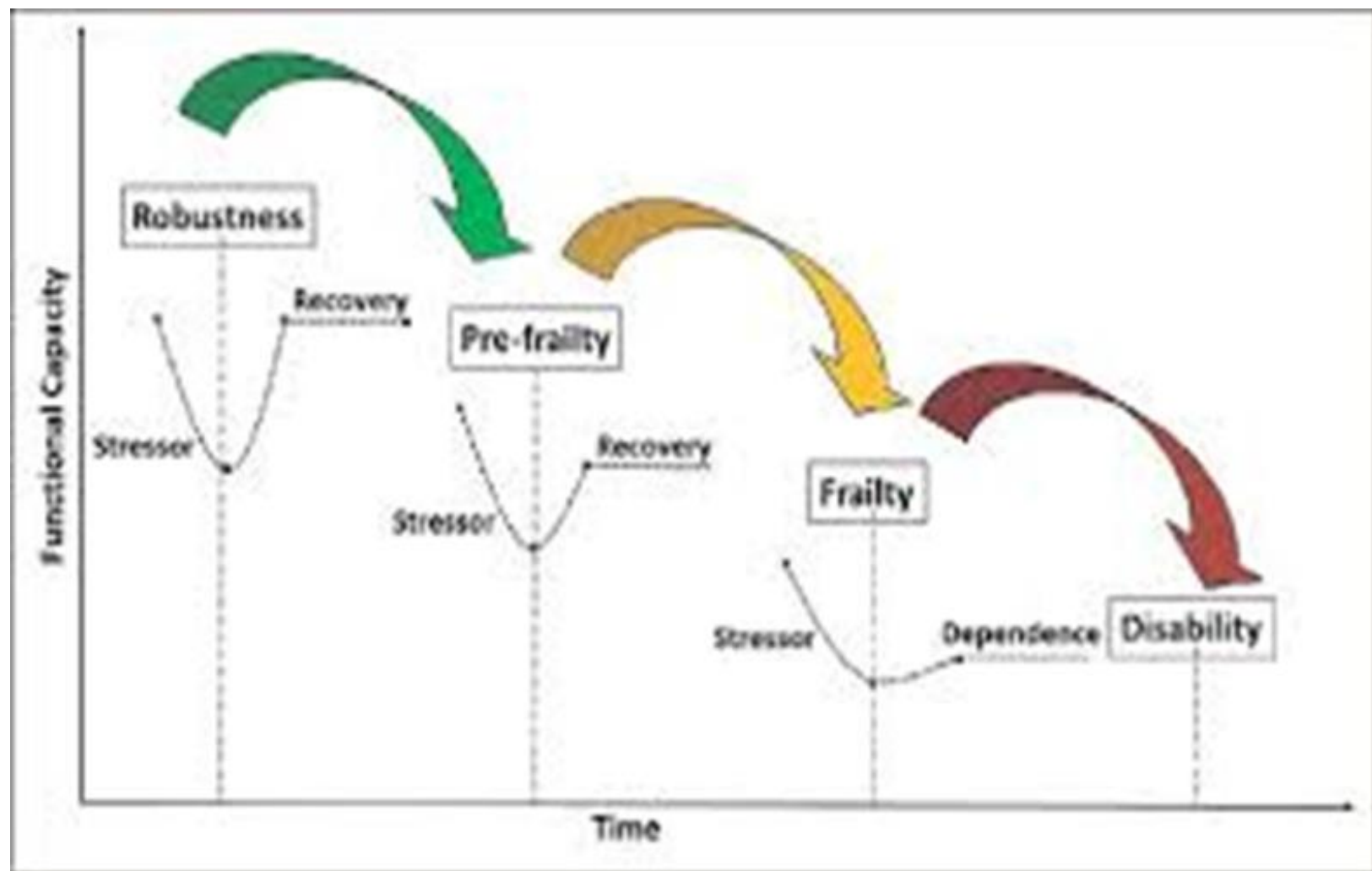
PSYCHOLOGICAL DIMENSION

Problems with memory
Feeling down
Feeling nervous or anxious
Problems with coping

SOCIAL DIMENSION

Living alone
Lack of people around
Lack of people's support

FRAILITY



Clinical Frailty Scale*



1 Very Fit – People who are robust, active, energetic and motivated. These people commonly exercise regularly. They are among the fittest for their age.



2 Well – People who have **no active disease symptoms** but are less fit than category 1. Often, they exercise or are very **active occasionally**, e.g. seasonally.



3 Managing Well – People whose **medical problems are well controlled**, but are **not regularly active** beyond routine walking.



4 Vulnerable – While **not dependent** on others for daily help, often **symptoms limit activities**. A common complaint is being "slowed up", and/or being tired during the day.



5 Mildly Frail – These people often have **more evident slowing**, and need help in **high order IADLs** (finances, transportation, heavy housework, medications). Typically, mild frailty progressively impairs shopping and walking outside alone, meal preparation and housework.



6 Moderately Frail – People need help with **all outside activities** and with **keeping house**. Inside, they often have problems with stairs and need **help with bathing** and might need minimal assistance (cuing, standby) with dressing.



7 Severely Frail – **Completely dependent for personal care**, from whatever cause (physical or cognitive). Even so, they seem stable and not at high risk of dying (within ~ 6 months).



8 Very Severely Frail – Completely dependent, approaching the end of life. Typically, they could not recover even from a minor illness.



9. Terminally Ill - Approaching the end of life. This category applies to people with a **life expectancy <6 months**, who are **not otherwise evidently frail**.

Scoring frailty in people with dementia

The degree of frailty corresponds to the degree of dementia. Common **symptoms in mild dementia** include forgetting the details of a recent event, though still remembering the event itself, repeating the same question/story and social withdrawal.

In **moderate dementia**, recent memory is very impaired, even though they seemingly can remember their past life events well. They can do personal care with prompting.

In **severe dementia**, they cannot do personal care without help.

* 1. Canadian Study on Health & Aging. Revised 2008.

2. K. Rodiwood et al. A global clinical measure of fitness and frailty in elderly people. CMAJ 2005;173:489-495.

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RISK FACTORS FOR FALLS

PHYSICAL CHANGES

- Decreased physical abilities
- Health Conditions

BEHAVIOURS

- Risk-taking behaviours
- Lack of awareness
- Fear of falling

HABITS

- Lack of activity/exercise
- Poor sleep patterns
- Inadequate nutrition
- Alcohol abuse
- General habits

YOUR ENVIRONMENT

- Indoor & outdoor home hazards
- Other environmental hazards

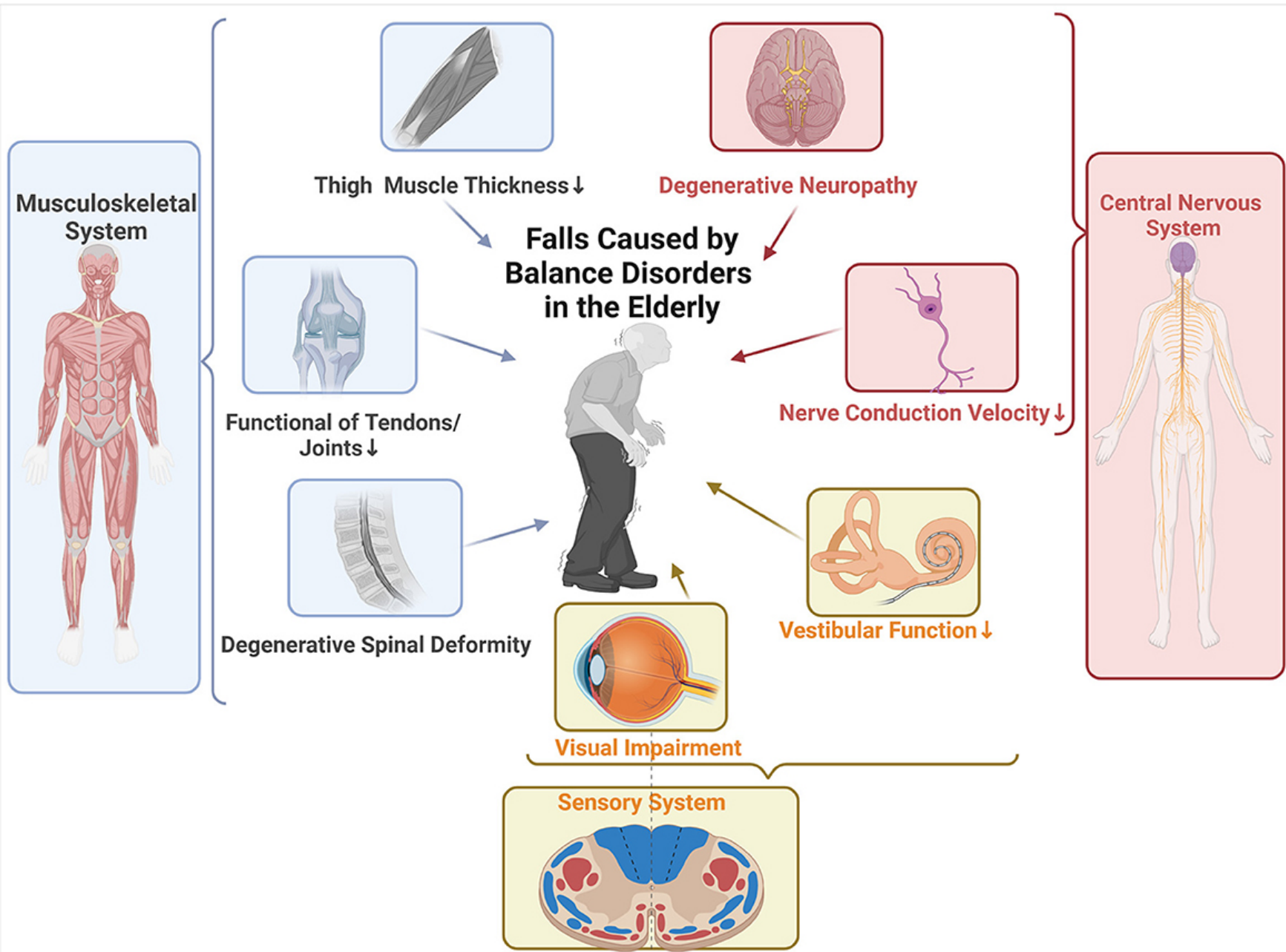
FALLS & INJURY

CLOTHING/ EQUIPMENT

- Clothing (e.g. loose)
- Footwear (e.g. heels)
- Incorrect mobility aid
- Not using mobility aid or assistive device

MEDICATION

- Certain types of medication (and quantity)



Six Tips To Help Prevent Falls

More than one in four people age 65 years or older fall each year, yet many falls can be prevented.

Talk with your health care provider about medication side effects



Do strength and balance exercises

Make your home safer by using night lights, installing grab bars in the bathroom, and securing carpet to the floors



Get your vision and hearing checked regularly

Stand up slowly to avoid dizziness



Use a cane or walker if you need more stability



Learn more about reducing your risk of falling at www.nia.nih.gov/falls-prevention.



Physical Abuse

An act that causes physical pain, injury or a combination of both. Physical abuse may appear as a change in appearance, attitude or behaviour.



Financial Abuse

This is the theft or misuse of an older person's money, assets or property.



Emotional or Psychological Abuse

Any act that causes emotional pain, anguish, or distress or is demeaning to an individual.

What is Elder Abuse?

compass
GUIDING ACTION ON ELDER ABUSE



Sexual Abuse

Any behaviour of a sexual nature, done to an older person without their consent.
This includes physical interactions and non-contact acts of a sexual nature.



Neglect

The failure to meet an older person's basic needs, such as food, shelter, clothing, warmth or essential medical care.

Financial Signs of Elder Abuse



Fraudulent signatures on financial documents



Unpaid bills



Unusual or sudden changes in spending patterns, will, or other financial documents

Emotional/Behavioral Signs of Elder Abuse



Increased fear or anxiety



Isolation from friends or family



Unusual changes in behavior or sleep



Withdrawal from normal activities

Physical Signs of Elder Abuse



Dehydration or unusual weight loss



Missing daily living aids



Unexplained injuries, bruises, cuts, or sores



Unsanitary living conditions and poor hygiene



Unattended medical needs



11 Things that Anyone Can Do to Prevent Elder Abuse

1 Learn the **signs of elder abuse and neglect**



2 **Call or visit an elderly loved one** and ask how he or she is doing

3 Provide a respite **break for a caregiver**



4 Ask your bank manager to train tellers on **how to detect elder financial abuse**

5 **Ask your doctor** to ask you and all other senior patients about possible family violence in their lives



6 **Contact your local Adult Protective Services or Long-Term Care Ombudsman** to learn how to support their work helping at-risk elders and adults with disabilities

7 Organize a **"Respect Your Elders" essay or poster contest** in your child's school

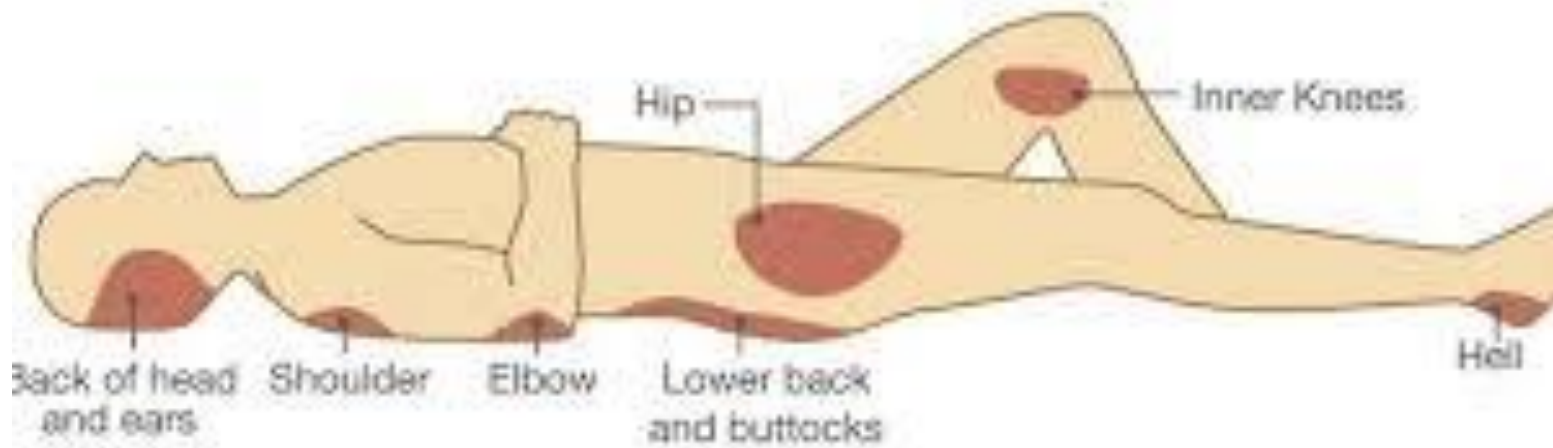
8 Ask your religious congregation's leader to **give a talk about elder abuse** at a service or to put a message about elder abuse in the bulletin

9 **Volunteer to be a friendly visitor** to a nursing home resident or to a homebound senior in your neighborhood

10 Send a letter to your local paper, radio or TV station suggesting that they cover **World Elder Abuse Awareness Day** (June 15) or **Grandparents Day** in September



11 Dedicate your **bikeathon/marathon/other event** to elder mistreatment awareness and prevention



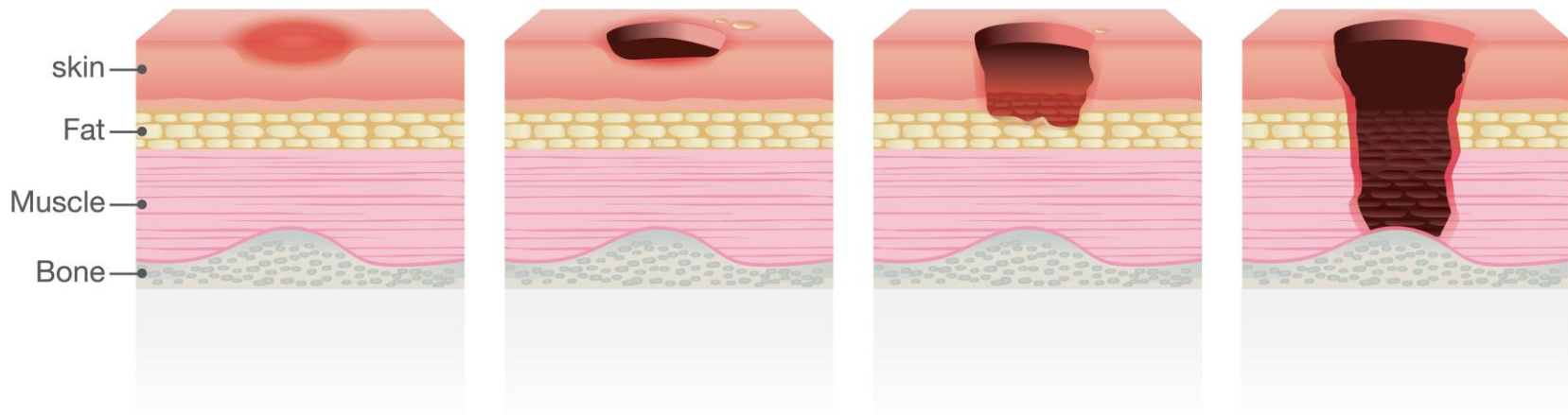
PRESSURE SORES

Stage1

Stage2

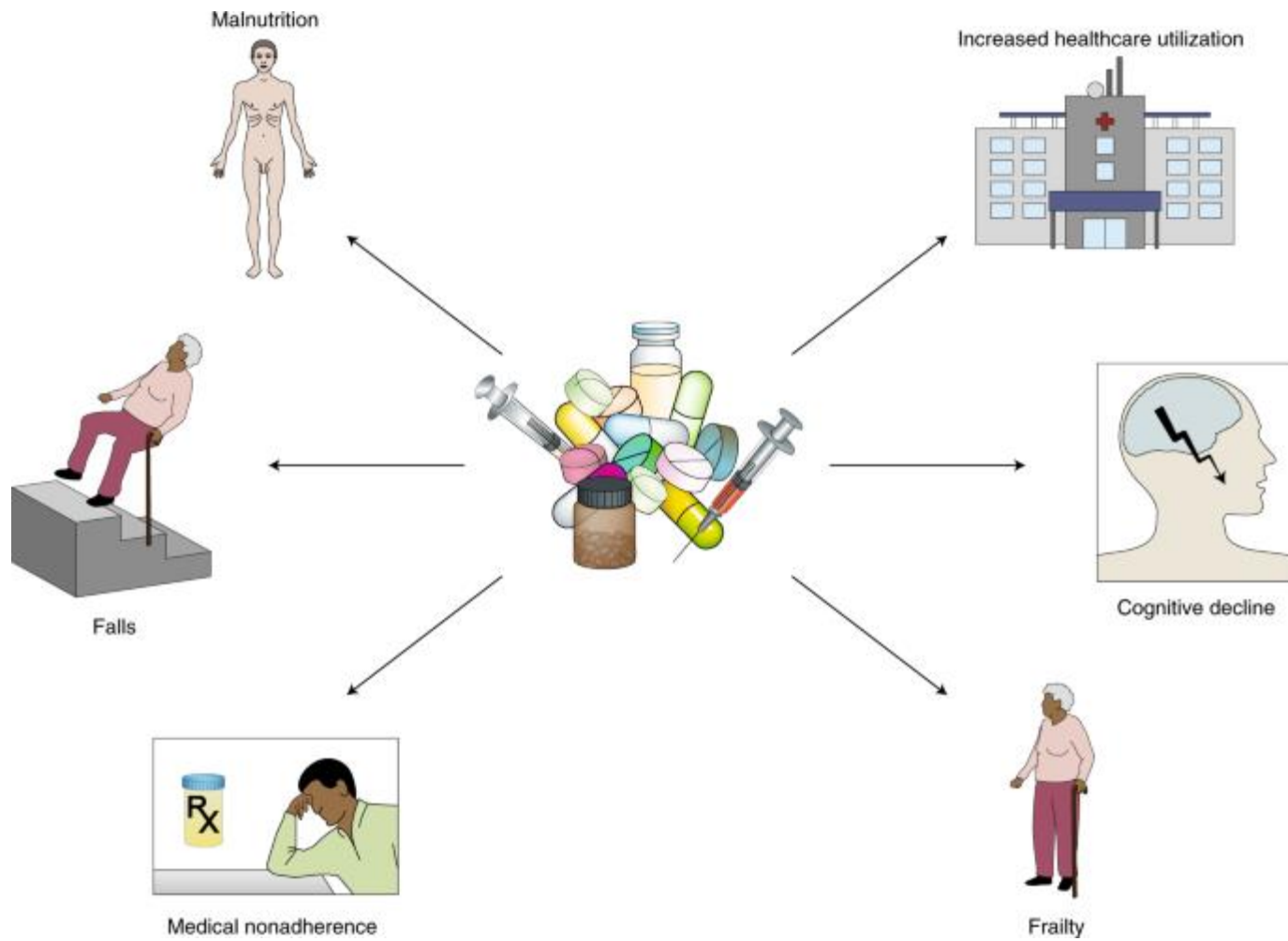
Stage3

Stage4



Pressure ulcers (Bed sores) stages





URINARY INCONTINENCE

* INVOLUNTARILY PASSES URINE

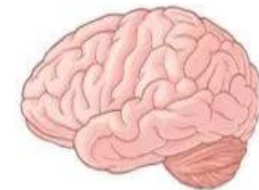
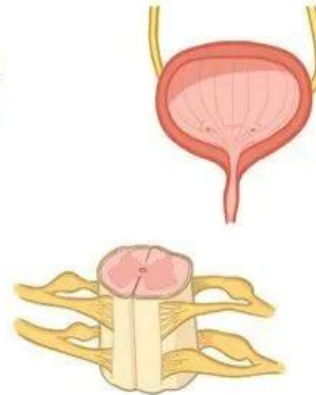
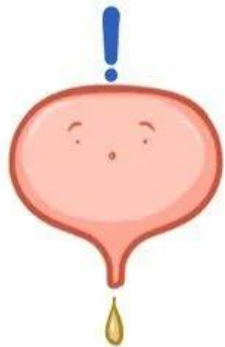
TEMPORARY: REVERSIBLE once CAUSE RESOLVED

- ~ BLADDER INFECTION
- ~ REMOVING CATHETER PLACED for LONG TIME



PERSISTENT: IRREVERSIBLE

- ~ DECREASED MUSCLE TONE
 - └ CHILD BIRTH or OBESITY
- ~ INJURIES or CONDITIONS
 - └ SPINAL CORD
 - └ BRAIN
 - └ NERVES
 - └ DEMENTIA



Causes Mnemonic - DIAPERS



- Delirium
- Infection of the bladder or urethra
- Atrophic vaginitis
- Pharmaceuticals, including alcohol, caffeine and artificial sweeteners
- Excess excretion
- Restricted mobility
- Stool impaction