

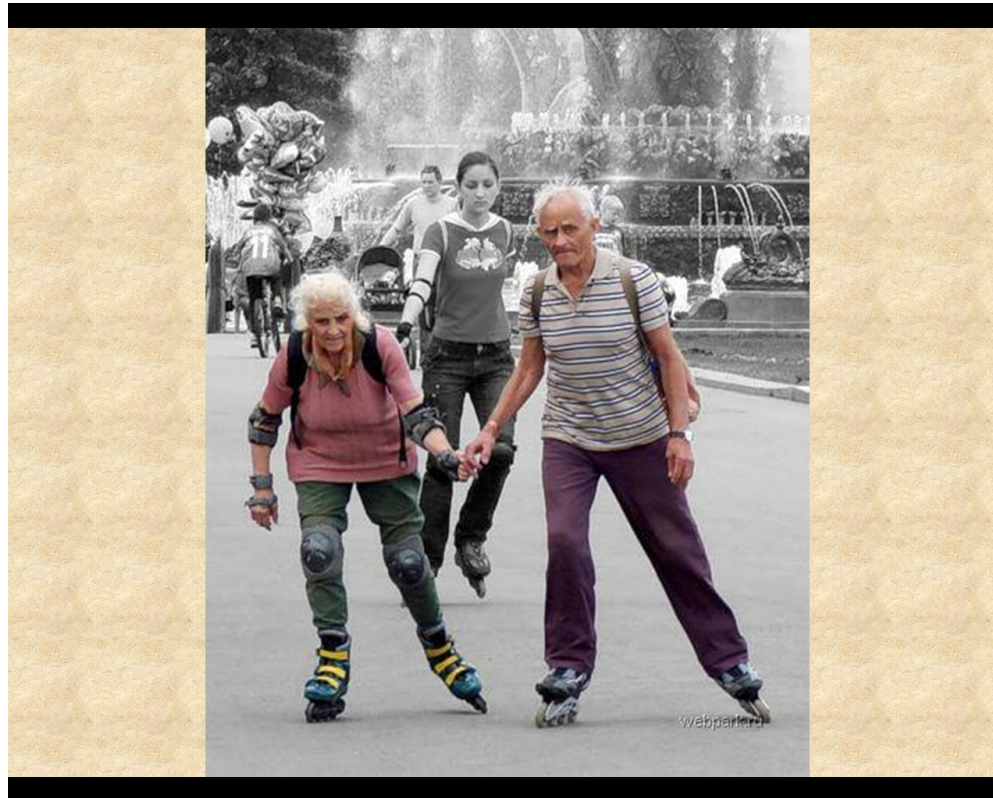
# The basic principles of gerontology



The modern strategy of health support and increasing of independence of seniors

# Gerontology

- ▶ the body of knowledge on ageing, about the problems of aging people and life in old age



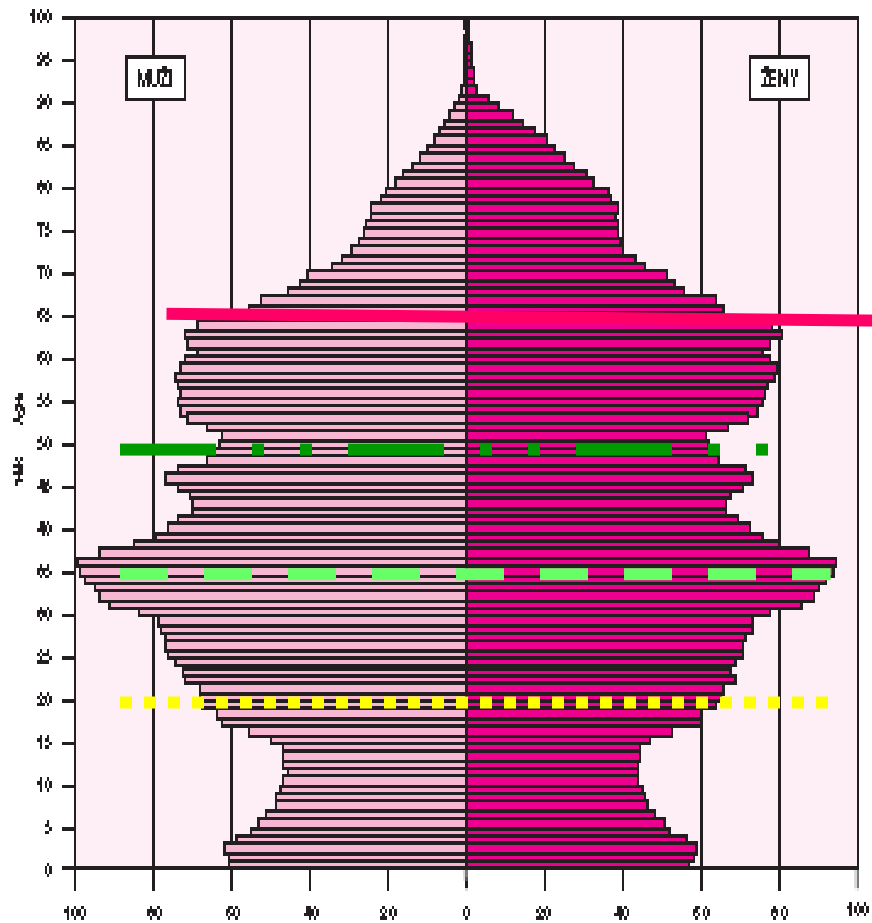
# Gerontology subspecialties I

- ▶ **experimental gerontology** - causes and ways of ageing, actually at the cellular and molecular level, neuropsychology of ageing
- ▶ **social gerontology** - relationship between aging people and society, needs of elderly, demography, sociology, economy, law, urbanistics, architecture etc
- ▶ **clinical gerontology** - geriatrics

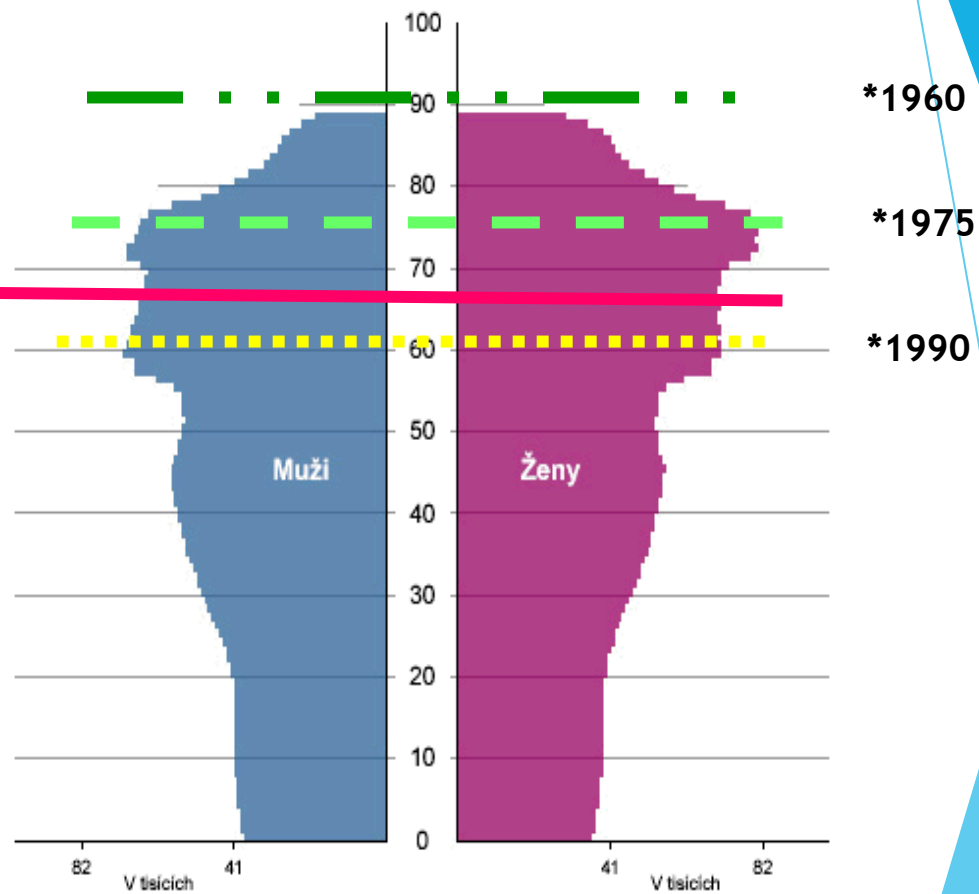
# Gerontology subspecialties II

- ▶ **geriatrics** - summarizes and generalizes across all disciplines main topics of senior's health and functional status, specific needs, specificities of appearance, symptoms, therapy, prevention and social context of diseases of old age

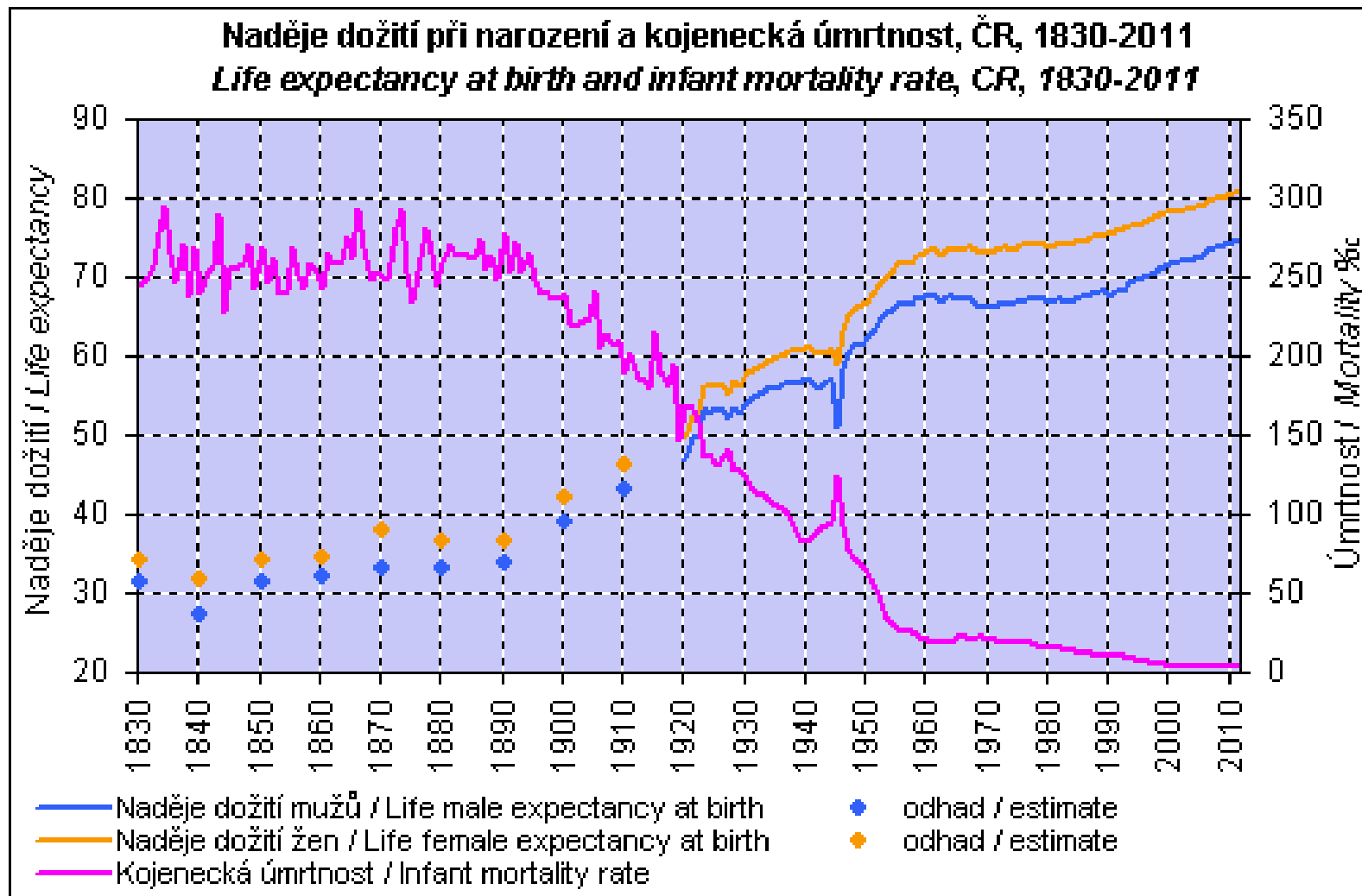
VĚKOVÁ STRUKTURA OBYVATELSTVA ČR K 31. 12. 2010  
AGE STRUCTURE OF THE CR POPULATION AS AT 31 DECEMBER 2010



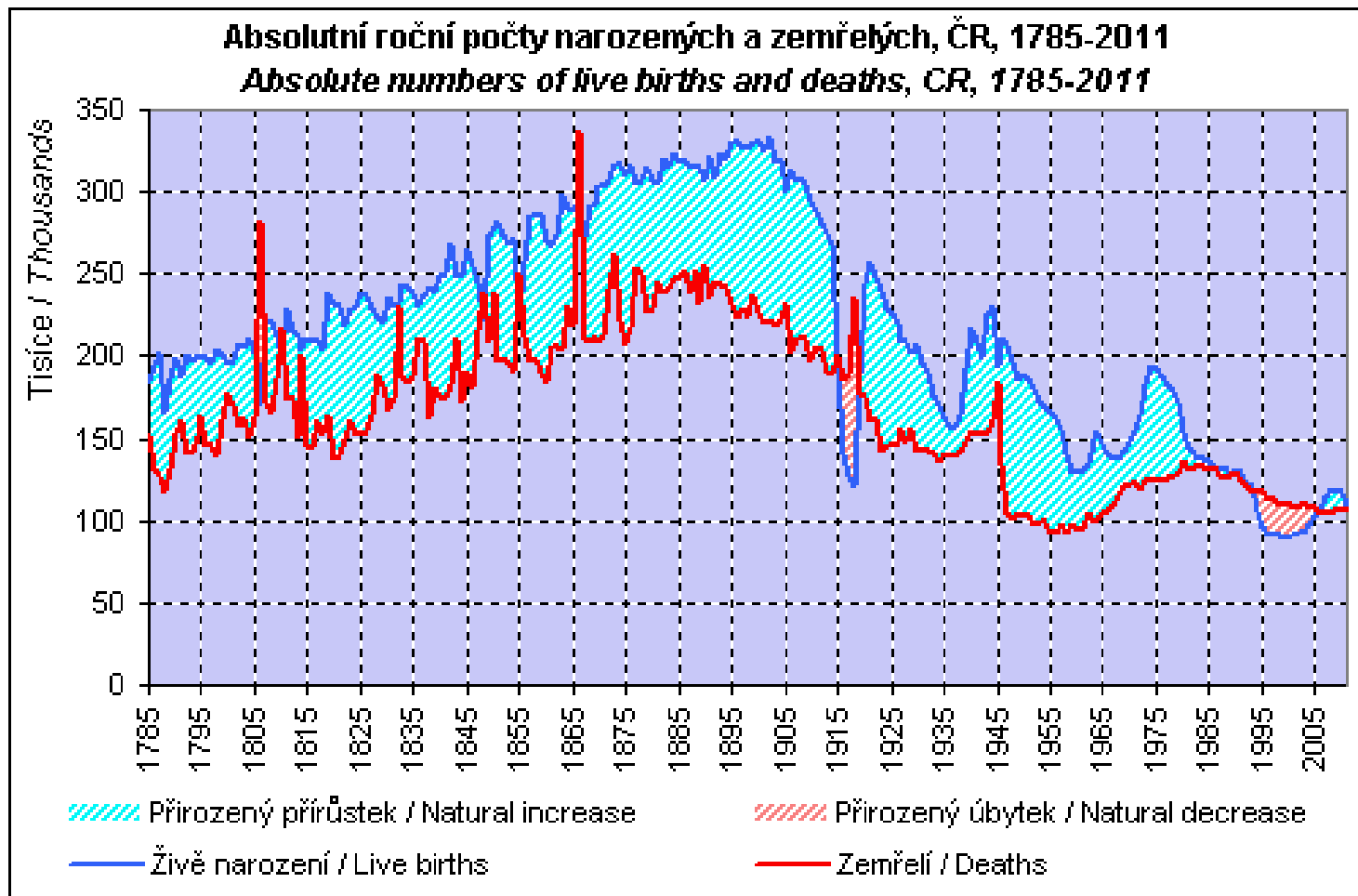
Věková skladba obyvatelstva: 2050  
Česká republika



Expected changes of the population age-structure 2010-2050



# Life expectancy and infant mortality rate



## Absolute numbers of live births and deaths 1785-2011

Specific features of diseases in  
elderly

**Risk of false diagnosis**



# Oligosymptomatology

- ▶ **expression of less typical symptoms**
  - peritonitis without defence musculaire**
  - ⇒ **pneumonia without fever**
  - ⇒ **cystitis with polakisuria, but without pain**
  - ⇒ **tachybradycardia only in hyperthyreosis**

# Microsymptomatology

- uroinfection without fever
- uncomplete inflammation symptomatology
- myocardial infarction without typical stenocardia, but with chest tightness only
- florid ulcer disease with dyspepsia, but without typical pain
- inflammation leucocytosis absent



# „Another organ cries“

- ▶ **current disease burden most frail organs**
- ⇒ **cardiac failure because of pneumonia**
- ⇒ **confusion caused by sepsis, urosepsis**
- ⇒ **stenocardia more expressed in anemia**
- ⇒ **TIA in anemia, cardiac failure, myocardial infarction**

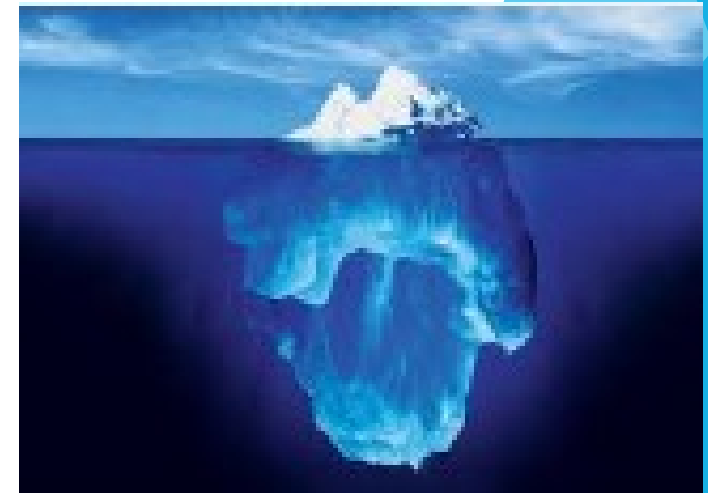
# Polymorbidity

- ▶ the number of chronic diseases increases with age
- ▶ 80% of patients above 80 years suffer from more than one chronic disease
- ▶ diseases influence each other - more frequently negatively
- ▶ polypragmasia, compliance, interaction
- ▶ long term recovery
- ▶ risk of immobilization



# Glacier like symptom

- **apparent symptomatology is the little part of reality only**
- **dyspnea in myocardial infarction only**
- **confusion in cardiac failure**
- **confusion in acute abdomen**
- **dementia progression caused by chronic pain**



# Interdisciplinary problems

**geriatric giants „4 I“**

**instability**

**cognitive disturbances**

**immobilization**

**incontinence, skin integrity  
disorders**

# Specificities and peculiarities of pharmacotherapy in elderly

**Problem topics**  
**Farmacokinetics**  
**Compliance**

## Problem topics

- ❑ pharmacokinetics, pharmacodynamics
- ❑ compliance
- ❑ polymorbidity
- ❑ polypragmasia
- ❑ medications market
- ❑ the patient's wishes
- ❑ treatment coordination
- ❑ „external“ influences





# Farmakokinetics I

- decrease of gastric acidity
- decrease of gastric motility
- reduced GIT blood flow
- slower resorption

# Farmacokinetics II

- **decreased distribution volume for hydrosolubile substentions**
- **increased distribution volume for liposolubile substentions**
- **decreased liver and kidney function**
- **decreased albumin concentration**

# Compliance and its changes in elderly I

- ▶ **reciprocal association between compliance and number of medications used**
  - 5 medications take exactly 33-44%,
  - 10 medications 10-20% only
- ▶ **influence of relatives and caregivers**
- ▶ **dependence on specialised supervision**

# Compliance and its changes in elderly II

- ▶ medication price influence
- ▶ user's comfort
- ▶ medication shape and color
- ▶ content of package leaflet



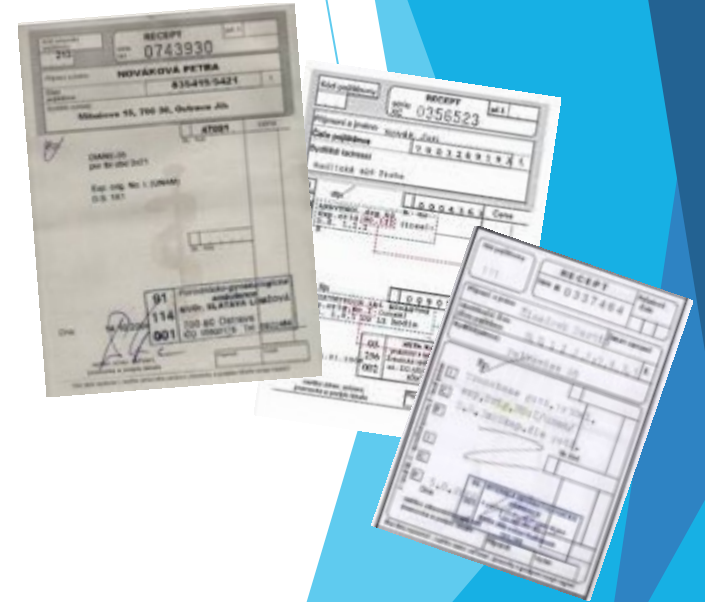
# Polypragmasia? Polypharmacotherapy?

- ▶ tackle fundamental problems
- ▶ improve the quality of life
- ▶ prophylactic medications
- ▶ number of medications limitation?
- ▶ respecting of guidelines
- ▶ unwanted symptoms induced by therapy  
express 24-28% patients, 90% of symptoms  
are predictable



# Therapy coordination problems

- ❖ „gate keeping“x confidence in the knowledge of GP
- ❖ „travelling“ around out-patient clinics
- ❖ addition of recommended treatments
- ❖ lack of communication between GPs and specialists
- ❖ financial limitations of GPs and specialists
- ❖ doubled generics



# Medication at the market

- ▶ many market names of the same generic substance
- ▶ the elderly patient remembers the medication according to shape and colour
- ▶ the influence of advertisement
- ▶ the influence of friends or neighbors „me too“



# Seniors and medications consumption

- ▶ **age group 60-75 years creates 15% of population**
- **consums 33% prescription medications**
- **consums 40% OTC medications**



# Creating the medication schedule

- ▶ **one coordinator**
- ▶ **specialist's recommendations**
- ▶ **substantial medications**
- ▶ **or to know or to consult**

# Ten rules for elderly prescription I

- » 1. Define substantial problems to treat
- » 2. Define treatment targets
- » 3. Consider alternative methods including education and non pharmacologicla methods
- » 4. Consider all risks and risk medications already taken
- » 5. Optimal dosage “start low go slow”

# Ten rules for elderly prescription II

- » 6. Select the simplest schedule
- » 7. Consider the risk of cumulation in retarded medications
- » 8. Prepare the table containing redommended medications and ask the patient about understanding
- » 9. Ask the use of OTC or other substances
- » 10. Consider the possibility to stop the taking of some medication

# Non-pharmacological therapy

- ▶ **positive alternative to polypragmasia**
- ▶ **regime measures - sleeping rhythm, to use the bed for sleeping only, regular day and week rhythm**
- ▶ **reduction of harmful habits**
- ▶ **change of eating habits - regular warm dishes, care for oral cavity and teeth**

# Comprehensive geriatric assessment

The right side of the slide features a series of overlapping, angular shapes in various shades of blue, ranging from light sky blue to a deep navy blue. These shapes create a dynamic, modern graphic element that contrasts with the plain white background on the left.

# Comprehensive geriatric assessment (CGA)

- ❑ **personality**
- ❑ **somatic health**
- ❑ **functional status**
- ❑ **psychical health**
- ❑ **social context**

# Personality

- ✓ life situations
- ✓ priorities and decisions - treat/not to treat, reanimate/not to reanimate, decisions in dementia
- ✓ subjective quality of life



# Somatic health

- ✓ **diseases - main diseases, other diseases**
- ✓ **functional burden of diseases**
- ✓ **syndromological dg (imobilization, incontinentia ...)**



# Functional efficiency

- ✓ stability and walking
- ✓ performance and independence
- ✓ physical condition
- ✓ nutrition



# Mental health



- ✓ cognitive and fatic disorders and deliria - active screening and evaluation
- ✓ affective disorders (depression) - active screening and evaluation
- ✓ mental balance, maladaptation, the influence of psychosocial stressors

# Social context

- ✓ social roles and relationships (social network)
- ✓ operation demands and safety of the home environment
- ✓ social needs supplied or claimed



# Evaluation of stability and walking disorders

- ❖ basic neurological assessment
- ❖ getting up from lying to a sitting position and from sitting position to standing
- ❖ spontaneous standing
- ❖ maneuvers in standing - Romberg, pull test, push test
- ❖ spontaneous walking - 10m - base width, length of the step, fluidity of movement, start and stop, rotation, obstacles
- ❖ maneuvers in walking - on heels, on tiptoes, with closed eyes, backwards, tandem walking

# Possible pathologies

- ✓ walking of width base with unstable destination
- ✓ polyneuropathic walking - uncertainty, weakness of lower extremities
- ✓ cerebellar walking - like ebrietas
- ✓ choreatic walking
- ✓ short step, stiffness
- ✓ inability to start the step



# Evaluation of physical performance

- ❑ anamnestic - comparison with contemporaries, with standards - ADL, IADL
- ❑ stress tests - speed evaluation, observation of EKG, blood pressure, heart rate
- ❑ selection of tests - izometric, izotonic, treadmill



# ADL

## Barthel Index Scoring Form

Patient Name: \_\_\_\_\_ Rater Name: \_\_\_\_\_ Date: \_\_\_\_\_

### FEEDING

- 0 = unable
- 5 = needs help cutting, spreading butter, etc., or requires modified diet
- 10 = independent

### BATHING

- 0 = dependent
- 5 = independent (or in shower)

### GROOMING

- 0 = needs to help with personal care
- 5 = independent face/hair/teeth/shaving (implements provided)

### DRESSING

- 0 = dependent
- 5 = needs help but can do about half unaided
- 10 = independent (including buttons, zips, laces, etc.)

### BOWELS

- 0 = incontinent (or needs to be given enemas)
- 5 = occasional accident
- 10 = continent

### BLADDER

- 0 = incontinent, or catheterized and unable to manage alone
- 5 = occasional accident
- 10 = continent

### TOILET USE

- 0 = dependent
- 5 = needs some help, but can do something alone
- 10 = independent (on and off, dressing, wiping)

### TRANSFERS (BED TO CHAIR AND BACK)

- 0 = unable, no sitting balance
- 5 = major help (one or two people, physical), can sit
- 10 = minor help (verbal or physical)
- 15 = independent

### MOBILITY (ON LEVEL SURFACES)

- 0 = immobile or < 50 yards
- 5 = wheelchair independent, including corners, > 50 yards
- 10 = walks with help of one person (verbal or physical) > 50 yards
- 15 = independent (but may use any aid; for example, stick) > 50 yards

### STAIRS

- 0 = unable
- 5 = needs help (verbal, physical, carrying aid)
- 10 = independent

TOTAL SCORE= \_\_\_\_\_



# IADL

## Test IADL – instrumental activities of daily living

activity	performance	points
1. ability to use telephone	operates telephone on own initiative; looks up and dials numbers, etc. dials a few well known numbers, answers telephone but does not dial does not use telephone at all	10 5 0
2. transport	travels independently on public transportation or drives own car travels on public transportation when assisted or accompanied by another travel limited to taxi or automobile, with assistance of another or does not travel at all.	10 5 0
3. shopping	takes care of all shopping needs independently needs to be accompanied on any shopping trip not able to shop at all.	10 5 0
4. food preparation	plans, prepares and serves adequate meals independently heats and serves prepared meals, or prepares meals but does not maintain adequate diet needs to have meals prepared and served	10 5 0
5. housekeeping	maintains house alone or with occasional assistance (e.g., heavy-work domestic help) performs light daily tasks such as dish-washing and bed-making, but cannot maintain acceptable level of cleanliness does not participate in any housekeeping tasks.	10 5 0
6. laundry	does personal laundry completely launders small items; rinses socks, stockings, etc. all laundry must be done by others.	10 5 0
7. responsibility for own medication	is responsible for taking medication in correct dosages at correct time takes responsibility if medication is prepared in advance in separate dosages. is not capable of dispensing own medication.	10 5 0
8. ability to handle finances	manages financial matters independently (budgets, write checks, pays rent and bills, goes to Bank) collects and keeps track of income manages day-to-day purchases, but needs help with banking, major purchases, etc. incapable of handling money.	10 5 0
Evaluation of independence in instrumental activities of daily living 0 – 40 dependent in IADL 45 – 75 partially dependent in IADL 80 independent in IADL		total



# Cognitive performance evaluation


## ▶ MMSE

- Mini Mental State Examination 30-27-23-18-13
- clock test
- test connecting numbers and letters

### Mini-Mental State Examination (MMSE)

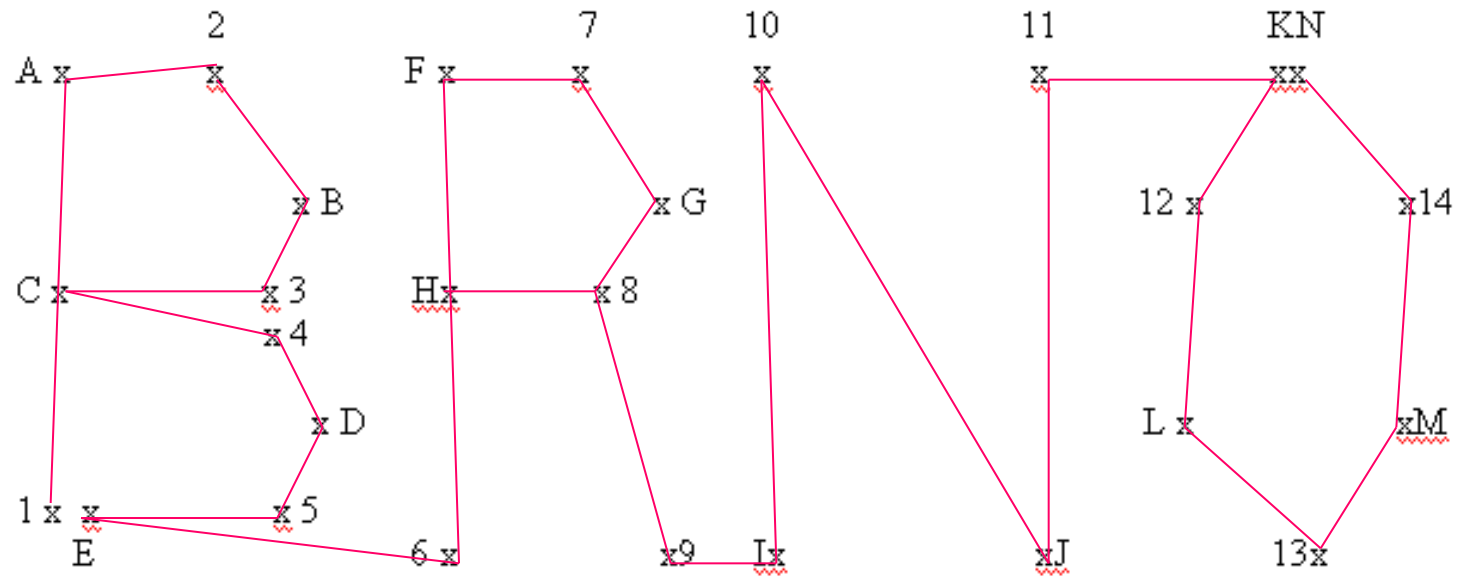
Patient's Name: \_\_\_\_\_ Date: \_\_\_\_\_

*Instructions: Ask the questions in the order listed. Score one point for each correct response within each question or activity.*

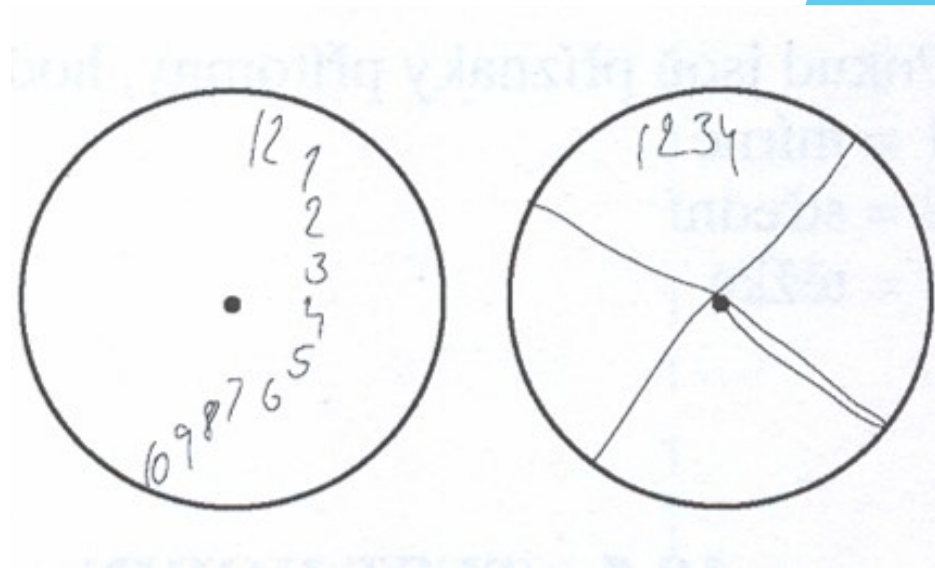
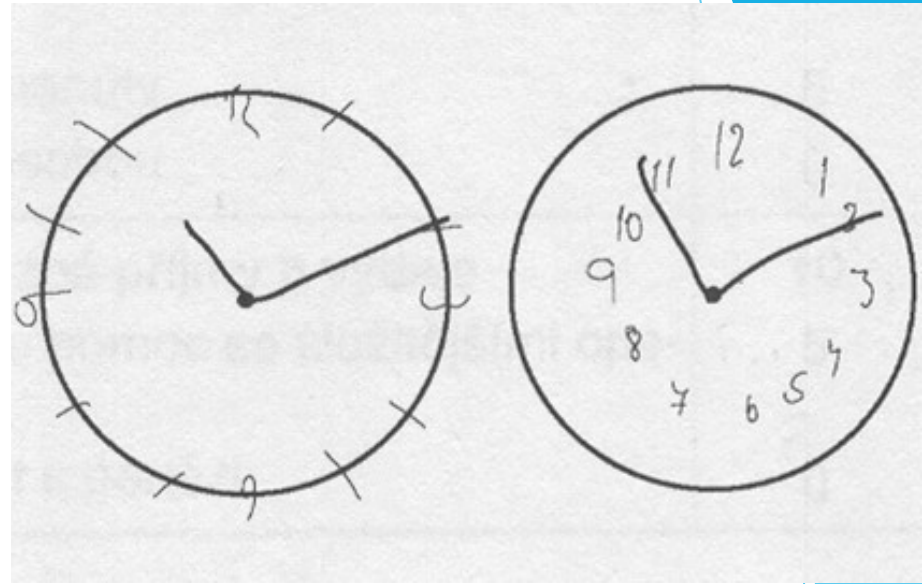
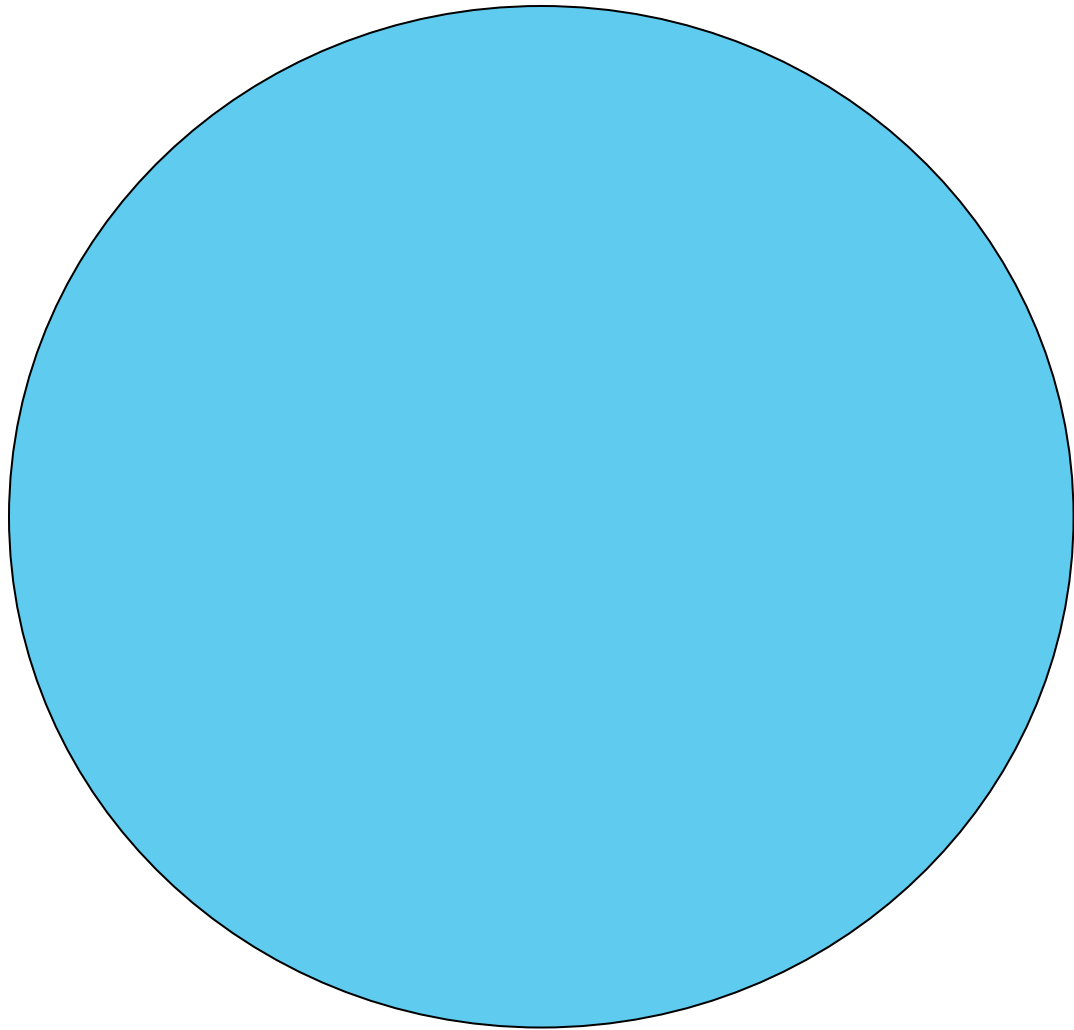
Maximum Score	Patient's Score	Questions
5		"What is the year? Season? Date? Day of the week? Month?"
5		"Where are we now: State? County? Town/city? Hospital? Floor?"
3		The examiner names three unrelated objects clearly and slowly, then asks the patient to name all three of them. The patient's response is used for scoring. The examiner repeats them until patient learns all of them, if possible. Number of trials: _____
5		"I would like you to count backward from 100 by sevens." (93, 86, 79, 72, 65, ...) Stop after five answers. Alternative: "Spell WORLD backwards." (D-L-R-O-W)
3		"Earlier I told you the names of three things. Can you tell me what those were?"
2		Show the patient two simple objects, such as a wristwatch and a pencil, and ask the patient to name them.
1		"Repeat the phrase: 'No ifs, ands, or buts.'"
3		"Take the paper in your right hand, fold it in half, and put it on the floor." (The examiner gives the patient a piece of blank paper.)
1		"Please read this and do what it says." (Written instruction is "Close your eyes.")
1		"Make up and write a sentence about anything." (This sentence must contain a noun and a verb.)
1		"Please copy this picture." (The examiner gives the patient a blank piece of paper and asks him/her to draw the symbol below. All 10 angles must be present and two must intersect.) 
30		TOTAL

(Adapted from Rovner & Folstein, 1987)

# Connecting numbers and letters



# Clock test



# Depression evaluation

## Geriatric Depression Scale (Short Form)

Patient's Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Instructions:** Choose the best answer for how you felt over the past week. Note: when asking the patient to complete the form, provide the self-rated form (Included on the following page).

No.	Question	Answer	Score
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 people?	YES / NO	
11.	Do you think it is wonderful to be alive?	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	
TOTAL			

(Sheikh & Yesavage, 1986)

### Scoring:

Answers indicating depression are in bold and italicized; score one point for each one selected. A score of 0 to 5 is normal. A score greater than 5 suggests depression.

### Sources:

- Sheikh JI, Yesavage JA. Geriatric Depression Scale (GDS): recent evidence and development of a shorter version. *Clin Gerontol.* 1986 June;5(1/2):165-173.
- Yesavage JA. Geriatric Depression Scale. *Psychopharmacol Bull.* 1988;24(4):709-711.
- Yesavage JA, Brink TL, Rose TL, et al. Development and validation of a geriatric depression screening scale: a preliminary report. *J Psychiatr Res.* 1982-83;17(1):37-49.

# MNA I

## Mini Nutritional Assessment MNA®

Nestlé  
Nutrition Institute

Last name:  First name:   
 Sex:  Age:  Weight, kg:  Height, cm:  Date:

Complete the screen by filling in the boxes with the appropriate numbers.  
 Add the numbers for the screen. If score is 11 or less, continue with the assessment to gain a Malnutrition Indicator Score.

Screening	
<b>A</b> Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties? 0 = severe decrease in food intake 1 = moderate decrease in food intake 2 = no decrease in food intake	<input type="checkbox"/>
<b>B</b> Weight loss during the last 3 months 0 = weight loss greater than 3kg (6.6lbs) 1 = does not know 2 = weight loss between 1 and 3kg (2.2 and 6.6 lbs) 3 = no weight loss	<input type="checkbox"/>
<b>C</b> Mobility 0 = bed or chair bound 1 = able to get out of bed / chair but does not go out 2 = goes out	<input type="checkbox"/>
<b>D</b> Has suffered psychological stress or acute disease in the past 3 months? 0 = yes 2 = no	<input type="checkbox"/>
<b>E</b> Neuropsychological problems 0 = severe dementia or depression 1 = mild dementia 2 = no psychological problems	<input type="checkbox"/>
<b>F</b> Body Mass Index (BMI) = weight in kg / (height in m) <sup>2</sup> 0 = BMI less than 19 1 = BMI 19 to less than 21 2 = BMI 21 to less than 23 3 = BMI 23 or greater	<input type="checkbox"/>
Screening score (subtotal max. 14 points)	<input type="checkbox"/> <input type="checkbox"/>
12-14 points: <input type="checkbox"/> Normal nutritional status	
8-11 points: <input type="checkbox"/> At risk of malnutrition	
0-7 points: <input type="checkbox"/> Malnourished	
For a more in-depth assessment, continue with questions G-R	
Assessment	
<b>G</b> Lives independently (not in nursing home or hospital) 1 = yes 0 = no	<input type="checkbox"/>
<b>H</b> Takes more than 3 prescription drugs per day 0 = yes 1 = no	<input type="checkbox"/>
<b>I</b> Pressure sores or skin ulcers 0 = yes 1 = no	<input type="checkbox"/>
<b>J</b> How many full meals does the patient eat daily? 0 = 1 meal 1 = 2 meals 2 = 3 meals	<input type="checkbox"/>
<b>K</b> Selected consumption markers for protein intake • At least one serving of dairy products (milk, cheese, yoghurt) per day • Two or more servings of legumes or eggs per week • Meat, fish or poultry every day 0.0 = if 0 or 1 yes 0.5 = if 2 yes 1.0 = if 3 yes	yes <input type="checkbox"/> no <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> yes <input type="checkbox"/> no <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<b>L</b> Consumes two or more servings of fruit or vegetables per day? 0 = no 1 = yes	<input type="checkbox"/>
<b>M</b> How much fluid (water, juice, coffee, tea, milk...) is consumed per day? 0.0 = less than 3 cups 0.5 = 3 to 5 cups 1.0 = more than 5 cups	<input type="checkbox"/> <input type="checkbox"/>
<b>N</b> Mode of feeding 0 = unable to eat without assistance 1 = self-fed with some difficulty 2 = self-fed without any problem	<input type="checkbox"/>
<b>O</b> Self view of nutritional status 0 = views self as being malnourished 1 = is uncertain of nutritional state 2 = views self as having no nutritional problem	<input type="checkbox"/>
<b>P</b> In comparison with other people of the same age, how does the patient consider his / her health status? 0.0 = not as good 0.5 = does not know 1.0 = as good 2.0 = better	<input type="checkbox"/> <input type="checkbox"/>
<b>Q</b> Mid-arm circumference (MAC) in cm 0.0 = MAC less than 21 0.5 = MAC 21 to 22 1.0 = MAC greater than 22	<input type="checkbox"/> <input type="checkbox"/>
<b>R</b> Calf circumference (CC) in cm 0 = CC less than 31 1 = CC 31 or greater	<input type="checkbox"/>
Assessment (max. 16 points)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Screening score	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Total Assessment (max. 30 points)	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
<b>Malnutrition Indicator Score</b>	
24 to 30 points <input type="checkbox"/>	Normal nutritional status
17 to 23.5 points <input type="checkbox"/>	At risk of malnutrition
Less than 17 points <input type="checkbox"/>	Malnourished

References:  
 1. Wilks R, Wilks H, Abellan G, et al. Overview of the MNA® - Its History and Challenges. *J Nutr Health Aging*. 2006; 10:488-495.  
 2. Rubenstein LZ, Hanker JD, Silva A, Guigoz Y, Wilks R. Screening for Undernutrition in Geriatric Practice: Developing the Short-Form Mini Nutritional Assessment (MNA-SF). *J Geront*. 2001; 56A: M366-377.  
 3. Guigoz Y. The Mini-Nutritional Assessment (MNA®): Review of the Literature - What does it tell us? *J Nutr Health Aging*. 2005; 9: 455-467.  
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Thank you for your attention

