營養與老化 (00070115)
Nutrition and Aging
Nutritional Assessment of the Elderly

http://www.nutriworkscnc.com/images/weightloss_cover.jpg

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Learning Objectives

- Nutritional Assessment
- Nutritional Screening & Instruments

References

- Geriatric Nutrition: The Health Professional's Handbook (2006, 3rd ed) Chernoff, R, Jones and Bartlett Publishers, Inc.
- Nutrition in Aging (1997, 3rd ed) Schlenker, ED, McGraw-Hill Higher Education

Nutritional Assessment

- **A**nthropometric assessment
- **B**iochemical assessment
- **C**linical assessment
- **D**ietary assessment
- **E**motional status
- **F**unctional status
- **M**ental/cognitive status
- **O**ral status

http://www.cmuh.org.tw/HTML/dept/1820-2/antiobesity/image/P5110060_edited.JPG

Nutritional Screening & Instruments

- **Screening**

  anemia, hyperlipidemia, diabetes, electrolyte disturbances

- **Instruments**

  Determine Your Nutritional Health

  Nutritional Risk Index (NRI)

  Geriatric Nutritional Risk Index (GNRI)

  Mini Nutritional Assessment (MNA)

Determine Your Nutritional Health

- **began in 1990**
- **under the direction of American Academy of Family Physicians, American Dietetic Association, National Council on the Aging**
- **$\geq 6 \Rightarrow$ ask professionals for help**

http://www.corbisimages.com/images/67/B0BB4A56-74F2-4400-8E77-F5765B180470/752-SC-005-Z2202.jpg

Determine Your Nutritional Health

I have an illness or condition that made me change the kind and/or amount of food I eat. (Yes: 2)

I eat fewer than 2 meals per day. (Yes: 3)

I eat few fruits or vegetables, or milk products. (Yes: 2)

I have 3 or more drinks of beer, liquor or wine almost every day. (Yes: 2)

I have tooth or mouth problems that make it hard for me to eat. (Yes: 2)

I don't always have enough money to buy the food I need. (Yes: 4)

I eat alone most of the time. (Yes: 1)

I take 3 or more different prescribed or over-the-counter drugs a day. (Yes: 1)

Without wanting to, I have lost or gained 10 pounds in the last 6 months. (Yes: 2)

I am not always physically able to shop, cook and/or feed myself. (Yes: 2)

Determine Your Nutritional Health

- **10 questions with a total score of 21**
- **0-2 Good!**

  Recheck your nutritional score in 6 months.
- **3-5 You are at moderate nutritional risk.**

  See what can be done to improve your eating habits and lifestyle. Your office on aging, senior nutrition program, senior citizens center or health department can help. Recheck your nutritional score in 3 months.
- **6 You are at high nutritional risk.**

  Bring this Checklist the next time you see your doctor, dietitian or other qualified health or social service professional. Talk with them about any problems you may have. Ask for help to improve your nutritional health.

Nutritional Risk Index (NRI)

- Kuczmarski MF& Kuczmarski RJ (1993)
- focus on mechanics of food intake, prescribed dietary restrictions, discomfort associated with food intake, significant changes in dietary habits, morbid conditions affecting food intake
- 16 questions
- ≥ 7 (Yes) ⇒ greater risk for poor nutritional status

Geriatric Nutritional Risk Index (GNRI)

- Bouillanne et al. (2005) *Am J Clin Nutr*
- replaced the usual weight in the formula by **ideal weight** according to the Lorentz formula (WLo), creating a new index called the Geriatric Nutritional Risk Index (GNRI)
- consider ideal bw and albumin concentration
- GNRI = [1.489 × albumin (g/L)]+[41.7 × present bw/ideal bw (WLo)]
- major risk (GNRI: **< 82**), moderate risk (GNRI: **82 to < 92**), low risk (GNRI: **92 to 98**), and no risk (GNRI: **> 98**)

Mini Nutritional Assessment (MNA)

- Guigoz Y & Vellas B (1995) in France
- a validated screening and assessment tool for identifying geriatric patients at risk of malnutrition
- 15 questions & 3 anthropometric measurements

  screening (5 questions + 1 measurement) and assessment (10 questions + 2 measurements)
- malnourished (MNA < 17 points), at risk for malnutrition (17–23.5 points) and well nourished (> 23.5 points)

NUTRITIONAL SCREENING ☐ No Problem Assessed

Oral diet prescribed: _____

☐ Enteral feeding: _____

☐ Oral supplements: _____

ONE (1) POINT

- ☐ Diabetes
- ☐ GI Mobility or Absorption Disorder
- ☐ Renal Failure – Abnormal lab K>5.5 BUN>100
- ☐ Severe Anemia – Abnormal labs HGB<9.0, Depressed HCT, MCV, MCHC
- ☐ Shortness of Breath, decreased ability to eat or drink
- ☐ Dry mouth, mouth soreness, alteration in smell or taste
- ☐ Special Diet (specify): _____
- ☐ Diarrhea lasting more than 5 days
- ☐ Nausea or vomiting more than 3 days per week
- ☐ Oral Intake less than 50% of usual for 10 consecutive days
- ☐ Involuntary weight loss in past 6 months
- ☐ Pressure Ulcers/Wounds (Stage I & II)
- ☐ Chewing Difficulties
- ☐ Impaired Swallowing

TOTAL POINTS: ☐

TWO (2) POINTS

- ☐ Active AIDs
- ☐ Pressure Ulcer/Wounds (Stage III & IV)
- ☐ Cancer or oral pharynx and/or GI tract
- ☐ Major Burns
- ☐ Lab: Albumin 3.0 or less
- ☐ COPD dependant on 0_2
- ☐ Pitting Edema (3+ - 4+)

THREE (3) POINTS

- ☐ Lab: Albumin <2.6
- ☐ Enteral Nutrition

Other (specify): _____

_____

_____

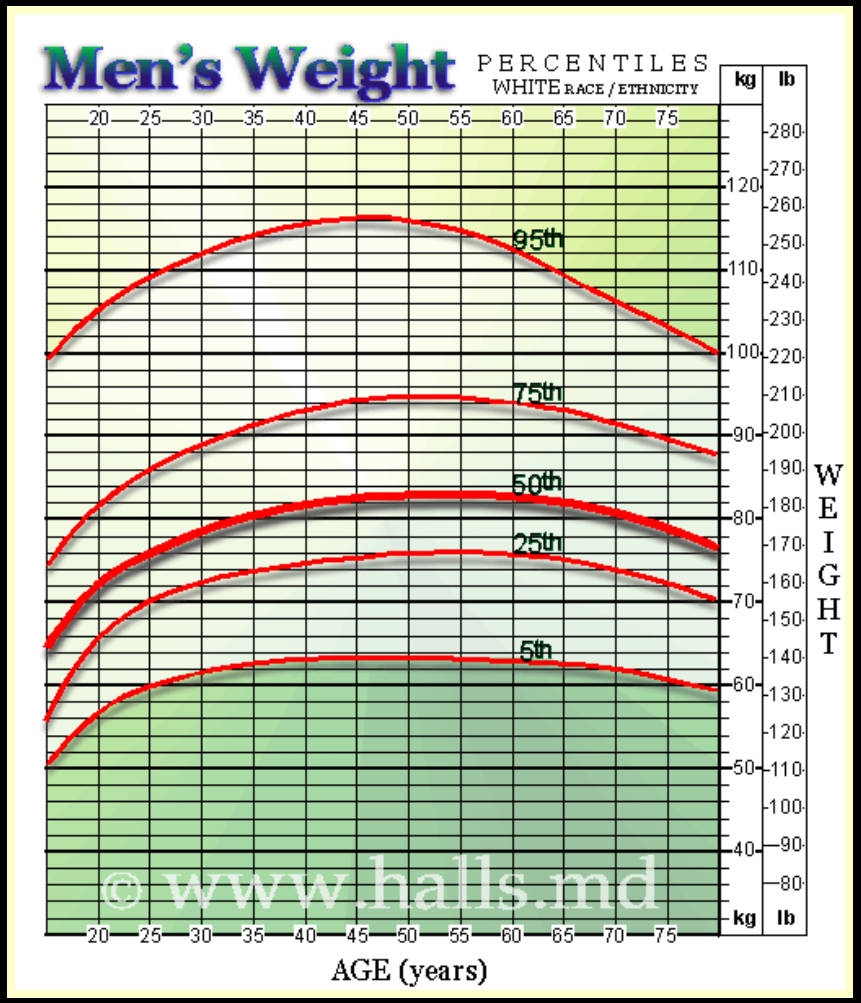
_____

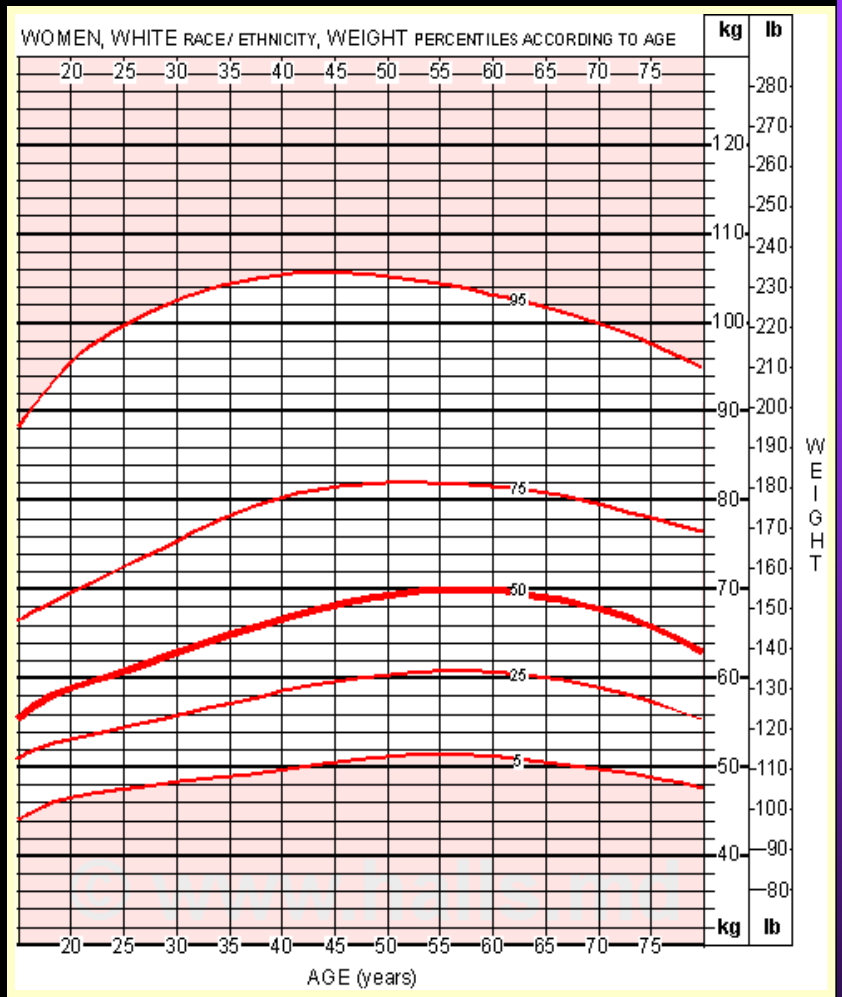
- **Less than 5 points - No dietician referral at this time**
- **5-6 points - Nurse/Dietician Telephone Consult. Dietician will make recommendations**
- **7 points - Request Dietician consult (phone contact or visit with patient)**

http://webteach.mc.uky.edu/nursing/nur869/webquests/lab1/lab1.htm

Anthropometric Assessment

- body weight (bw)
  - edema or severe dehydration can distort actual bw
- weight change
- stature/knee height (ht)
- relative weight for height (wt/ht)
- body mass index (BMI) = wt (kg)/ht^2 (m^2)
- circumferences
- skinfolds
- bioelectrical impedance



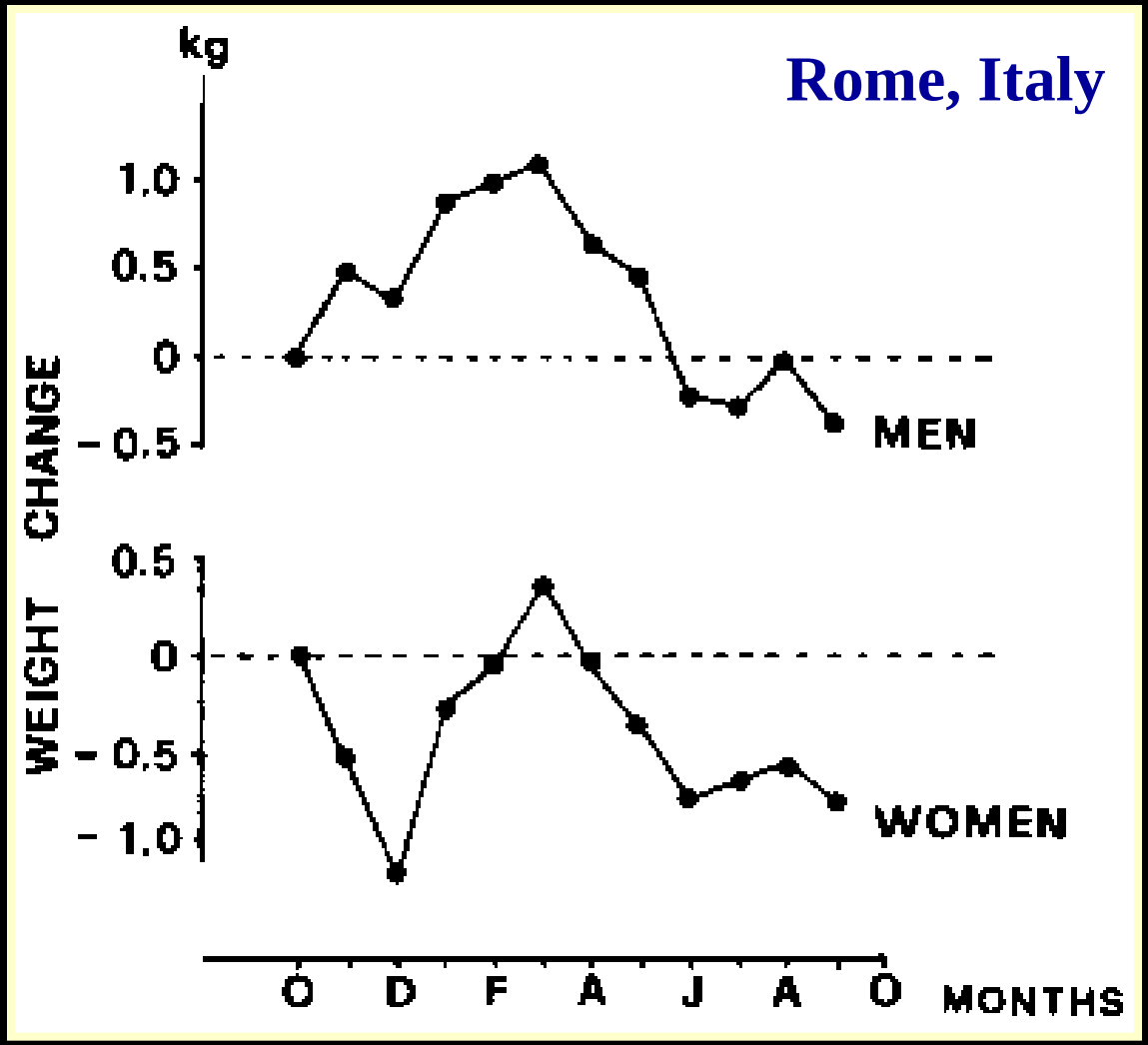


http://www.halls.md/chart/men-weight-w.htm
http://www.halls.md/chart/women-weight-w.htm

Weight Change

- a loss of 1~2% in a week
- a loss of 5% in a month
- a loss of 7.5% in 3 months
- a loss of 10% in 6 months

http://www.verysmallarray.com/?m=200212



http://www.unu.edu/Unupress/food2/UID08E/uid08e07.htm

BMI

- a correlation with body fat in young adults
- miscalculated estimates of body fat in older adults
- desirable BMI

19~24 yr	BMI = 19~24
25~34 yr	BMI = 20~25
35~44 yr	BMI = 21~26
45~54 yr	BMI = 22~27
55~64 yr	BMI = 23~28
> 65 yr	BMI = 24~29

- < 24 or > 27 $\Rightarrow$ recommend intervention

- **underweight**

  M < 20.7 F < 19.1
- **acceptable weight**

  M 20.7~26.4 F 19.1~25.8
- **marginal overweight**

  M 26.4~27.8 F 25.8~27.3
- **overweight**

  M 27.8~31.1 F 27.3~32.3
- **severe overweight**

  M 31.1~45.4 F 32.3~44.8
- **morbid obesity**

  M > 45.4 F > 44.8

BMI and Disease Risk

BMI	disease risk
20~25	very low
25~30	low
30~35	moderate
35~40	high
≥ 40	very high

Circumference Measurement

- ↑ age ⇒ a shift from extremities to **trunk**, esp. in **F**
  a shift from subcutaneous to **deep adipose tissue**
  a shift from peripheral to **central**
  abdominal fat accumulation: **M** (larger waist)> F
- ↑ waist-to-hip ratio, The National Institute of Diabetes, Digestive and Kidney Diseases (NIDDK):
  > **1.0** for M, > **0.8** for F ⇒ ↑ risk of disease steeply
- mid-upper arm circumference – reflect both subcutaneous fat and muscle of arm
  < **50th** or > **95th** percentile ⇒ more likely to have a nutritional disorder or disease

Skinfold Assessment

- a limited potential to reliably assess subcutaneous fat and accurately predict total body fat using regression equations

  redistribution of fat, ↓ elasticity of skin

  marked alterations in skin thickness

  atrophy of subcutaneous adipocity
- triceps skinfold: a **double** fold of subcutaneous fat thickness
- **> 95th / < 50th** percentile ⇒ obese / underweight
- mid arm circumference (cm) – (3.14 × triceps skinfold (mm))^2 ÷ 12.56 = estimate muscle mass

Bioelectrical Impedance Analysis (BIA)

- measure body compositions < 2 min
- simple, relatively inexpensive, safe, highly reproducible
- measure body water $\Rightarrow \uparrow$ risk for dehydration in older adults
- assess body fat-free mass (FFM): H_2O, proteins and minerals (body weight – wt of body fat)
- LBM includes structural lipids in cell membranes and nerves (body weight – fat from adipose tissue)

Biochemical Assessment

- Common problems: protein-energy malnutrition, hypercholesterolemia, iron & folate deficiency anemia
- protein status

  visceral protein status: serum albumin, prealbumin, transferrin

  erythrocytes, granulocytes, total lymphocyte count

  hemoglobin, serum cholesterol
- cholesterol status
- iron status
- folate status

Protein Status

- serum albumin: half-life 14~21 d

  alteration takes several weeks

  deficiency: < 3.0 (3.5) g/dL
- prealbumin (transthyretin): half-life 2 d

  a more timely and sensitive indicator of protein status

  deficiency: < 10 mg/dL
- transferrin: half-life 8~10 d

  a smaller body pool than albumin

  responses more rapidly
- deficiency: < 200 mg/dL

Protein Status

- **total lymphocyte count (TLC)**

  (% lymphocytes × WBC count)/100

  moderate protein depletion: < 1200/mm^3

  severe malnutrition: < 800/mm^3
- **↓ hemoglobin with ↑ age**

  anemia: M < 12 g/dl, F < 10 g/dL
- **serum cholesterol**

  a marker for PEM

  deficiency: < 160 mg/dL

  ↓ cholesterol ⇒ ↑ risk of hemorrhagic stroke in elderly

Cholesterol Status

- **hypercholesterolemia**

  total cholesterol (TC): ≥ 200 mg/dL
- **high risk for coronary artery disease**

  total cholesterol: ≥ 240 mg/dL

  LDL-cholesterol: ≥ 160 mg/dL

  triglycerides (TG): ≥ 200 mg/dL

  HDL-cholesterol (HDL-C): < 40 mg/dL

  TC/HDL-C: > 5
- **target goals**

  TC < 160 mg/dL, LDL-C < 100 or 70 mg/dL, TG < 150 mg/dL

Iron Status

- 3 stages

  (1) iron depletion:

  progressive reduction in the amount of storage iron (10 μg/dL < ferritin < 20 μg/dL)

  (2) iron deficient erythropoiesis:

  complete depletion of iron stores (ferritin = 10 μg/dL)

  (3) microcytic hypochromic anemia:

  ↓ Hb in RBC, ↓ MCV (mean corpuscular volume), ↓ hematocrit (ferritin < 10 μg/dL)

Folate Status

- causes:

  ↓ dietary folate intake

  malabsorption syndrome

  selected drugs (chronic aspirin use)

  chronic alcohol ingestion
- measure serum & erythrocyte folate levels

  serum folate: recent intake, acute status

  erythrocyte folate: body stores

  a more reliable index of folate status
- 3 stages like iron deficiency

Clinical Assessment

- clinical signs & syndromes

  night blindness

  due to cataracts not vitamin A deficiency
- functional status
- cognitive status
- oral health
- use of drug

http://library.nymc.edu/informatics/cartoon_blood_pressurfe.gif

Dietary Assessment

- **prospective method**

  food diary or record
- **retrospective method**

  24-h food recall or serial 24-h record
- **food frequency questionnaires**

  how often

  food intake patterns for diet and meal planning

http://www.kitchencontraptions.com/archives/pictures/B000BYAE7Y.01-A2ZRHY86EI3XZK._SCLZZZZZZZ_.jpg

Dietary Assessment

- **dietary history**

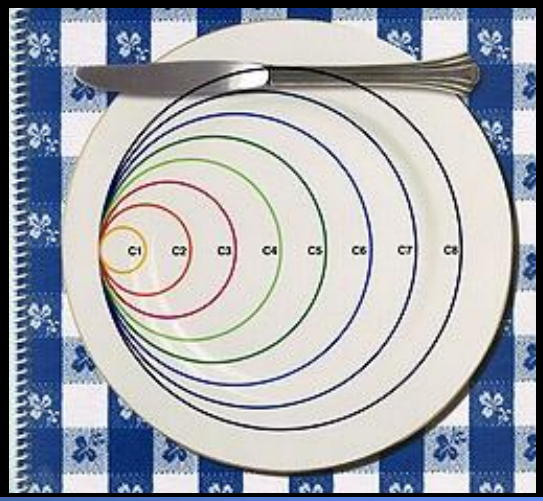
  food intake

  a typical day eating pattern

  occasional alternative foods

  usual portion sizes and irregularities

  3-d weighed (measured) food record



http://www.ars.usda.gov/is/graphics/photos/jun04/k11190-4i.jpg

Other Assessments

- **functional status**

  activities of daily living (ADL)

  feeding, food preparation, shopping, mode of transportation
- **oral status**

  dental caries, gingivitis, inflammatory periodontium (due to dryness of mouth), oral lesion or oral cancer
- **mental/cognitive status**

  dementia, chronic cognitive impairment

  intellectual capability, memory

Summary

- Nutritional Assessment
- Nutritional Screening & Instruments
  - Common problems: protein-energy malnutrition, hypercholesterolemia, iron & folate deficiency anemia