Mini Nutrition Assessment (MNA®): Nutrition Screening for the Elderly

Patricia Anthony, MS, RD
Head of Medical Affairs
Nestlé HealthCare Nutrition
Vevey, Switzerland

How can we most effectively identify elderly who are at risk of malnutrition?

Why Screen?

- 40% of patients entering the hospital are malnourished or at risk of malnutrition
- <40% of patients eat all the food they are served in the hospital
- Patients are discharged from hospital with malnutrition

Nutrition Screening

- *Purpose:* to quickly identify individuals nutritionally at-risk or who are malnourished
- Tests should be non-invasive, inexpensive, and have rapidly available results

Criteria for Nutrition Screening

- It should be validated!
  - Has it been shown to screen for the desired outcome?
    - Sensitivity, Specificity, Positive predictive value, Negative predictive value, inter-rater reliability
- It should be valid for the target patient population, target condition, target care setting

Does your screening tool meet the criteria ?

Guidelines

- **ASPEN**
  - All patients screened within 24 hrs of admission; those at risk undergo nutrition assessment
- ***ESPEN***
  - Healthcare organizations should have a policy & a specific set of protocols for identifying patients at nutritional risk.

    The following process is suggested:

    - Screening
    - Assessment
    - Monitoring & Outcome
    - Communication
    - Audit
  - All pts should be screened upon admission & linked to defined course of action

Validated Nutrition Screening Tools

- **MUST – *Malnutrition Universal Screening Tool***
- **NRS 2002 – *Nutrition Risk Screen***
- **MNA® - *Mini Nutritional Assessment***
- **SNAQ – *Short Nutritional Assessment Questionaire***
- **MST – *Malnutrition Screening Tool***
- **SGA – *Subjective Global Assessment***

Screening Tools
Recommended by ESPEN

- The community: MUST for adults
- The hospital: NRS – 2002
- The elderly: MNA®
- Children : Not yet available

Kondrup et al. Clin Nutr 22(4):415-421;2003.

MUST
Malnutrition Universal Screening Tool

- Developed in the UK by BAPEN Malnutrition Advisory Group (MAG)
- Designed to identify adults who are underweight and at risk of malnutrition, and the obese
- An easy, rapid, practical, reliable, validated tool
- Evaluated in the hospital, out patient, general practice, community, and long term care.
- Is linked to a care plan

www.bapen.org.uk

'MaInutrition Universal Screening Tool' ('MUST')

MAG

BAPEN

Step 1 + Step 2 + Step 3

Step 1	Step 2	Step 3
BMI score	Weight loss score	Acute disease effect score

Step 1 – BMI score

BMI kg/m²	Score
>20(>30 Obese)	= 0
18.5-20	= 1
<18.5	= 2

Step 2 – Weight loss score

Unplanned weight loss in past 3-6 months

%	Score
<5	= 0
5-10	= 1
>10	= 2

Step 3 – Acute disease effect score

If patient is acutely ill and there has been or is likely to be no nutritional intake for >5 days

Score 2

If unable to obtain height and weight, see reverse for alternative measurements and use of subjective criteria

Step 4

Overall risk of malnutrition

Add Scores together to calculate overall risk of malnutrition

Score 0 Low Risk Score 1 Medium Risk Score 2 or more High Risk

Step 5

Management guidelines

0 Low Risk

Routine clinical care

- Repeat screening
  Hospital – weekly
  Care Homes – monthly
  Community – annually
  for special groups
  e.g. those >75 yrs

1 Medium Risk

Observe

- Document dietary intake for 3 days if subject in hospital or care home
- If improved or adequate intake – little clinical concern; if no improvement – clinical concern - follow local policy
- Repeat screening
  Hospital – weekly
  Care Home – at least monthly
  Community – at least every 2-3 months

2 or more High Risk

Treat*

- Refer to dietitian, Nutritional Support Team or implement local policy*
- Improve and increase overall nutritional intake
- Monitor and review care plan
  Hospital – weekly
  Care Home – monthly
  Community – monthly

* Unless detrimental or no benefit is expected from nutritional support e.g. imminent death.

All risk categories:

- Treat underlying condition and provide help and advice on food choices, eating and drinking when necessary.
- Record malnutrition risk category.
- Record need for special diets and follow local policy.

Obesity:

- Record presence of obesity. For those with underlying conditions, these are generally controlled before the treatment of obesity.

Re-assess subjects identified at risk as they move through care settings

See The 'MUST' Explanatory Booklet for further details and The 'MUST' Report for supporting evidence.

MUST Criteria

- BMI
  - BMI > 20 = 0 points
  - BMI 18.5 – 20 = 1 point
  - BMI <18.5 = 2 points
- Wt loss in 3 – 6 months
  - < 5% = 0 points
  - 5 – 10 % = 1 point
  - > 10% = 2 points
- Acute disease effect
  - 2 points for little nutritional intake for >5 days (past / future)
- Summary Score:
  - 0 = low risk
  - 1 = moderate risk
  - 2 = high risk

Recommended Management Guidelines

0 = Low risk: Routine care

If obese / special diet – local policy
Hospital : repeat screen every week
Care homes :repeat screen every month
Community :repeat screen annually for special groups e.g. >75yr

1 = Medium risk: Observe

Help with food choices/ dietary advice
Hospital: Document dietary/fluid intake x 3d, repeat screen weekly
LTC: Document dietary/fluid intake x 3d, repeat screen monthly
Community: Repeat screen (2-3 monthly)

2 = High risk: Treat

Refer to Dietitian, NST or implement local policy
Improve nutritional intake
Monitor and review care plan

MUST criticism in elderly

- No items to assess functionality
- Too unspecific for the elderly
- Focus on acute illness makes it inappropriate for long-term care
- BMI cut off is too high

NRS 2002 - Nutrition Risk Screening

- Developed in 2003 (Kondrup et al - ESPEN)

- Screen includes measures of current potential undernutrition & disease severity

  Assumption: Indications for nutrition support are :

  - the severity of undernutrition
  - the increase in nutritional requirements from the disease

- Validated vs RCT of NS to determine if it was able to distinguish those with a positive clinical outcome vs those with no benefit.

- Recommended by ESPEN screening guidelines for hospitalized pts

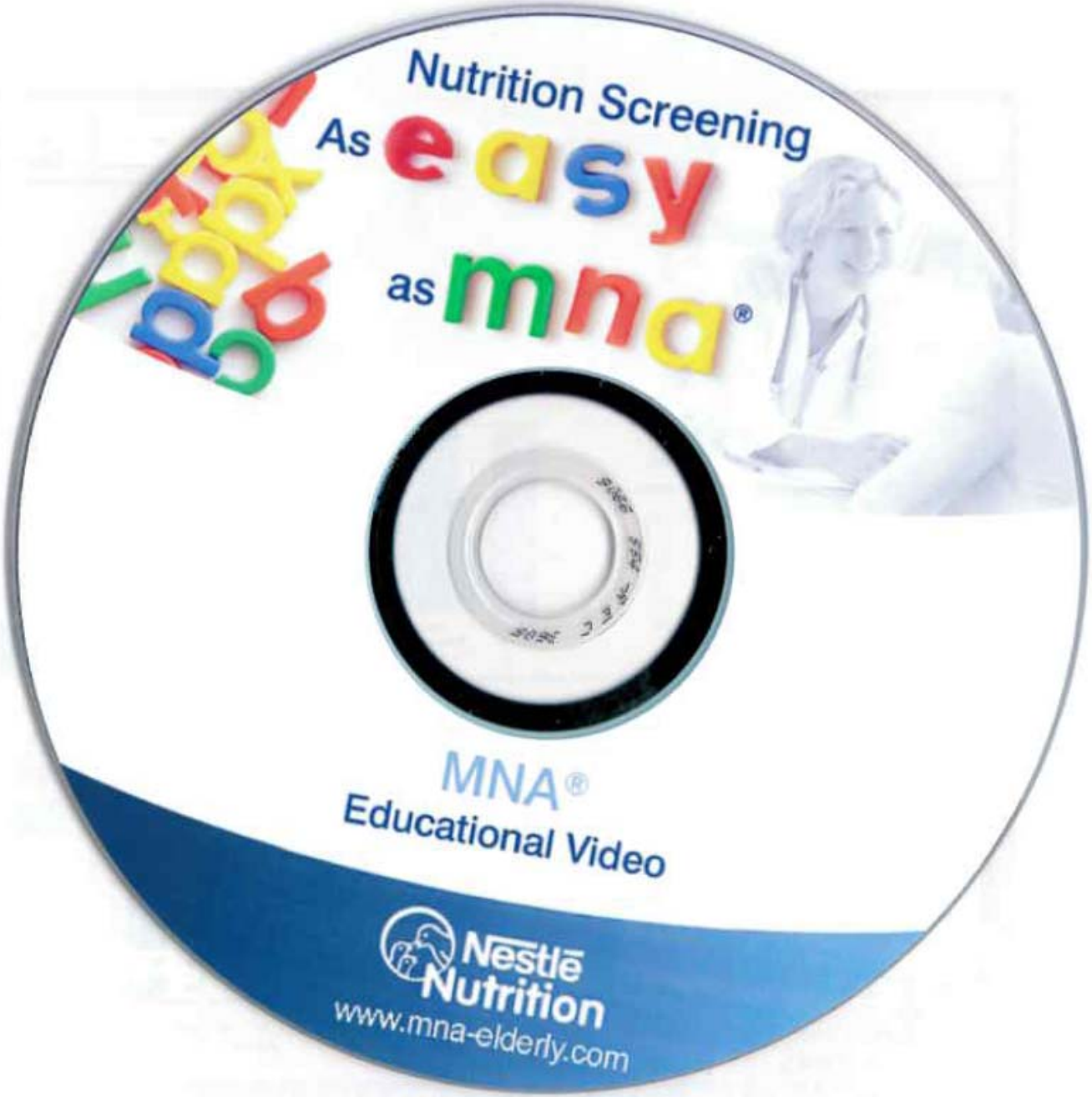
- Identifies who might benefit from nutritional support
  - Looking for positive clinical outcome

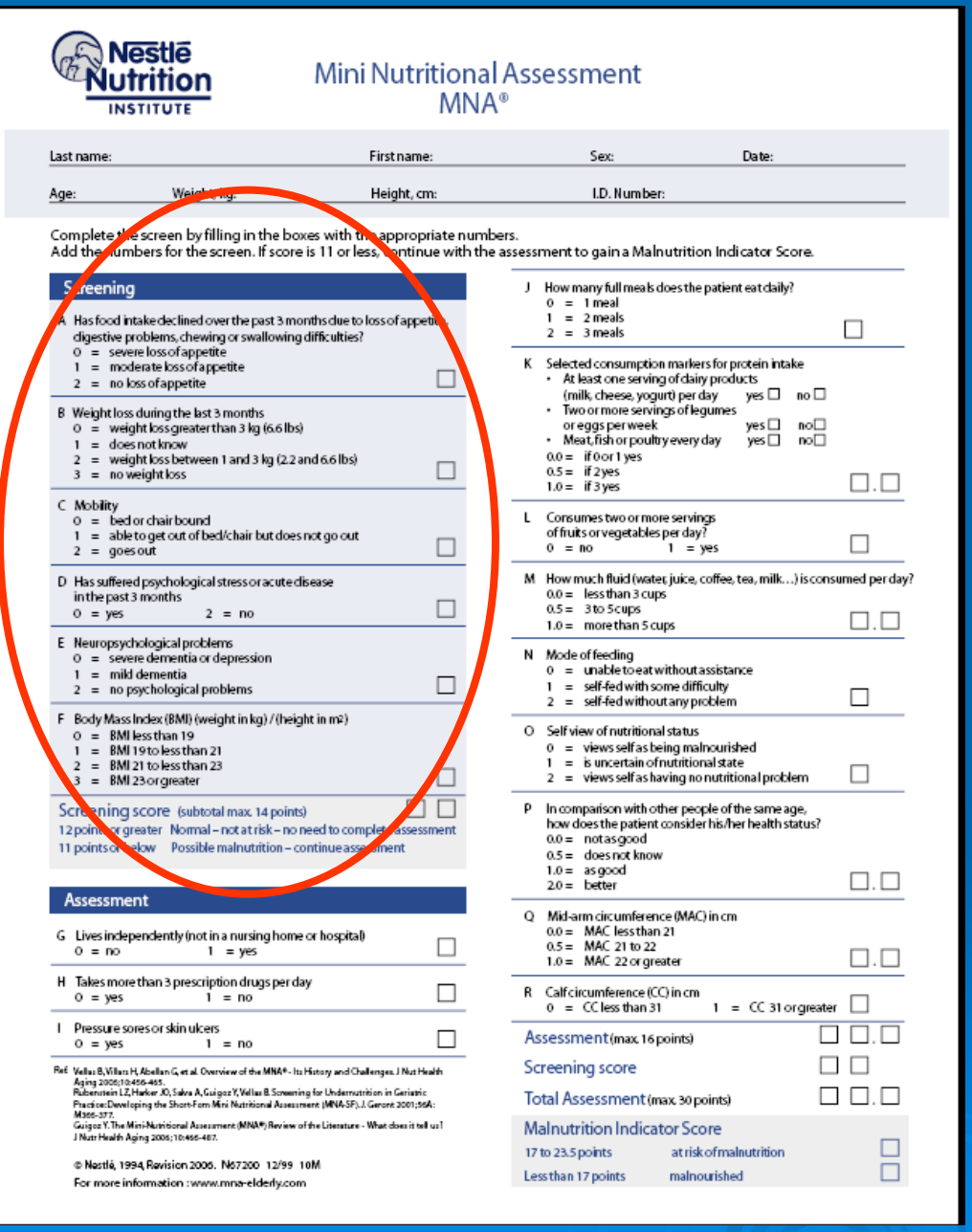
Nutritional Risk Screening 2002 (ESPEN guideline)			
Impaired nutritional status		**Severity of disease** (≈ requirement/stress-metabolism)	
Mild **Score 1**	Wt loss >5% in 3 mths Or Food intake <50-75% of normal requirement in preceding week.	Mild **Score 1**	Hip fracture (9). Chronic patients, in particular with acute complications: cirrhosis (11), COPD (12). *Chronic hemodialysis, diabetes, malignant oncology.*
Moderate **Score 2**	Wt loss >5% in 2 mths Or BMI 18.5 - 20.5 + impaired general condition Or Food intake 25-50% of normal requirement in preceding week	Moderate **Score 2**	Major abdominal surgery (13-15). Stroke (16). *Severe pneumonia, malignant hematology.*
Severe **Score 3**	Wt loss >5% in 1 mth (≈ >15% in 3 mths (17)) Or BMI <18.5 + impaired general condition (17) or Food intake 0-25% of normal requirement in preceding week	Severe **Score 3**	Head injury (18, 19). Bone marrow transplantation (20). *Intensive care patients (APACHE>10).*
Score: +		**Score:** **= TOTAL SCORE:**	

Scoring

- Score (0-3) for *Impaired nutritional status*
- Score (0-3) for *Severity of disease*
  (seen as indication of stress-metabolism thus an increase in nutritional requirements)
- Add the two scores to get **Total Score**
- **If age ≥ 70 years:** add 1 to the total score to correct for frailty of ageing
- If age-corrected total ≥3: Start Nutritional Support

Kondrup et al. Clin Nutr 2003; 22: 321-336


Nutrition Screening
As easy
as mna®
MNA®
Educational Video
Nestlé Nutrition
www.mna-elderly.com



Nestlé Nutrition INSTITUTE

Mini Nutritional Assessment
MNA®

Last name: First name: Sex: Date:

Age: Weight, kg: Height, cm: I.D. Number:

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

A Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?
0 = severe loss of appetite
1 = moderate loss of appetite
2 = no loss of appetite

B Weight loss during the last 3 months
0 = weight loss greater than 3 kg (6.6 lbs)
1 = does not know
2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs)
3 = no weight loss

C Mobility
0 = bed or chair bound
1 = able to get out of bed/chair but does not go out
2 = goes out

D Has suffered psychological stress or acute disease in the past 3 months
0 = yes 2 = no

E Neuropsychological problems
0 = severe dementia or depression
1 = mild dementia
2 = no psychological problems

F Body Mass Index (BMI) (weight in kg) / (height in m²)
0 = BMI less than 19
1 = BMI 19 to less than 21
2 = BMI 21 to less than 23
3 = BMI 23 or greater

Screening score (subtotal max. 14 points)
12 points or greater Normal – not at risk – no need to complete assessment
11 points or below Possible malnutrition – continue assessment

Assessment

G Lives independently (not in a nursing home or hospital)
0 = no 1 = yes

H Takes more than 3 prescription drugs per day
0 = yes 1 = no

I Pressure sores or skin ulcers
0 = yes 1 = no

J How many full meals does the patient eat daily?
0 = 1 meal
1 = 2 meals
2 = 3 meals

K Selected consumption markers for protein intake
- At least one serving of dairy products (milk, cheese, yogurt) per day yes no
- Two or more servings of legumes or eggs per week yes no
- Meat, fish or poultry every day yes no

0.0 = if 0 or 1 yes
0.5 = if 2 yes
1.0 = if 3 yes

L Consumes two or more servings of fruits or vegetables per day?
0 = no 1 = yes

M 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

N Mode of feeding
0 = unable to eat without assistance
1 = self-fed with some difficulty
2 = self-fed without any problem

O 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

P 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

Q Mid-arm circumference (MAC) in cm
0.0 = MAC less than 21
0.5 = MAC 21 to 22
1.0 = MAC 22 or greater

R Calf circumference (CC) in cm
0 = CC less than 31 1 = CC 31 or greater

Assessment (max. 16 points)
Screening score
Total Assessment (max. 30 points)

Malnutrition Indicator Score
17 to 23.5 points at risk of malnutrition
Less than 17 points malnourished

Ref. Vellas B, Villars H, Abellan G, et al. Overview of the MNA®- Its History and Challenges. J Nut Health Aging 2006;10:456-465.
Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. Screening for Undernutrition in Geriatric Practice: Developing the Short-Form Mini Nutritional Assessment (MNA-SF). J Geront 2001;56A: M366-372.
Guigoz Y. The Mini-Nutritional Assessment (MNA®) Review of the Literature - What does it tell us? J Nutr Health Aging 2006;10:466-487.

For more information : www.mna-elderly.com

MNA

- Developed in 1990
- Validated for ages 65+
- Simple, reliable, quick & non-invasive
- Validated across care settings
- Supported by > 400 publications

MNA-SF

- Based on the original MNA®
- Uses only 6 items
- Quicker tool for clinical use
- Validated in ambulatory elderly pts

Guigoz et al., *Nutr. Rev.* 1996;54:S59-65
Vellas et al., *J Am Geriatr Soc* 2000;48:1300-1309
Rubenstein et al., *J Gerontol* 2001;56:M366-M372

Comprehensive Geriatric Assessment (CGA)

Commonly Used Tools in CGA [40]

Cognitive Status
Mini Mental Status Examination (MMSE)

Affective Status
Yesavage Geriatric Depression Scale (GDS)

Mobility – Gait and Balance
Tinetti Performance-Oriented Mobility Assessment (POMA)

Functional Status - Activities of Daily Living
Katz Activities of Daily Living (ADL)

Functional Status - Instrumental Activities of Daily Living
Lawton Instrumental Activities of Daily Living (IADL)

Nutritional Adequacy
Mini Nutritional Assessment (MNA®)

The geriatric assessment is :

- a multidimensional, multidisciplinary diagnostic process used to determine medical, functional, and psychosocial problems and capabilities in an elderly patient who may be at risk for functional decline.

Nestlé Nutrition INSTITUTE

Mini Nutritional Assessment MNA®

Last name: First name:

Sex: Age: Weight, kg: Height, cm: Date:

Complete the screen by filling in the boxes with the appropriate numbers. Total the numbers for the final screening score.

Screening

A 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 ☐

B Weight loss during the last 3 months
0 = weight loss greater than 3 kg (6.6 lbs)
1 = does not know
2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs)
3 = no weight loss ☐

C Mobility
0 = bed or chair bound
1 = able to get out of bed / chair but does not go out
2 = goes out ☐

D Has suffered psychological stress or acute disease in the past 3 months?
0 = yes 2 = no ☐

E Neuropsychological problems
0 = severe dementia or depression
1 = mild dementia
2 = no psychological problems ☐

F1 Body Mass Index (BMI) (weight in kg) / (height in m^2)
0 = BMI less than 19
1 = BMI 19 to less than 21
2 = BMI 21 to less than 23
3 = BMI 23 or greater ☐

IF BMI IS NOT AVAILABLE, REPLACE QUESTION F1 WITH QUESTION F2.
DO NOT ANSWER QUESTION F2 IF QUESTION F1 IS ALREADY COMPLETED.

F2 Calf circumference (CC) in cm
0 = CC less than 31
3 = CC 31 or greater ☐

Screening score ☐☐
(max. 14 points)

12-14 points:	Normal nutritional status
8-11 points:	At risk of malnutrition
0-7 points:	Malnourished

For a more in-depth assessment, complete the full MNA® which is available at www.mna-elderly.com

Ref. Vellas B, Villars H, Abellan G, et al. *Overview of the MNA® - Its History and Challenges.* J Nutr Health Aging 2006;10:456-465.
Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. *Screening for Undernutrition in Geriatric Practice: Developing the Short-Form Mini Nutritional Assessment (MNA-SF).* J. Geront 2001;56A: M366-377.
Guigoz Y. *The Mini-Nutritional Assessment (MNA®) Review of the Literature - What does it tell us?* J Nutr Health Aging 2006; 10:466-487.

For more information: www.mna-elderly.com

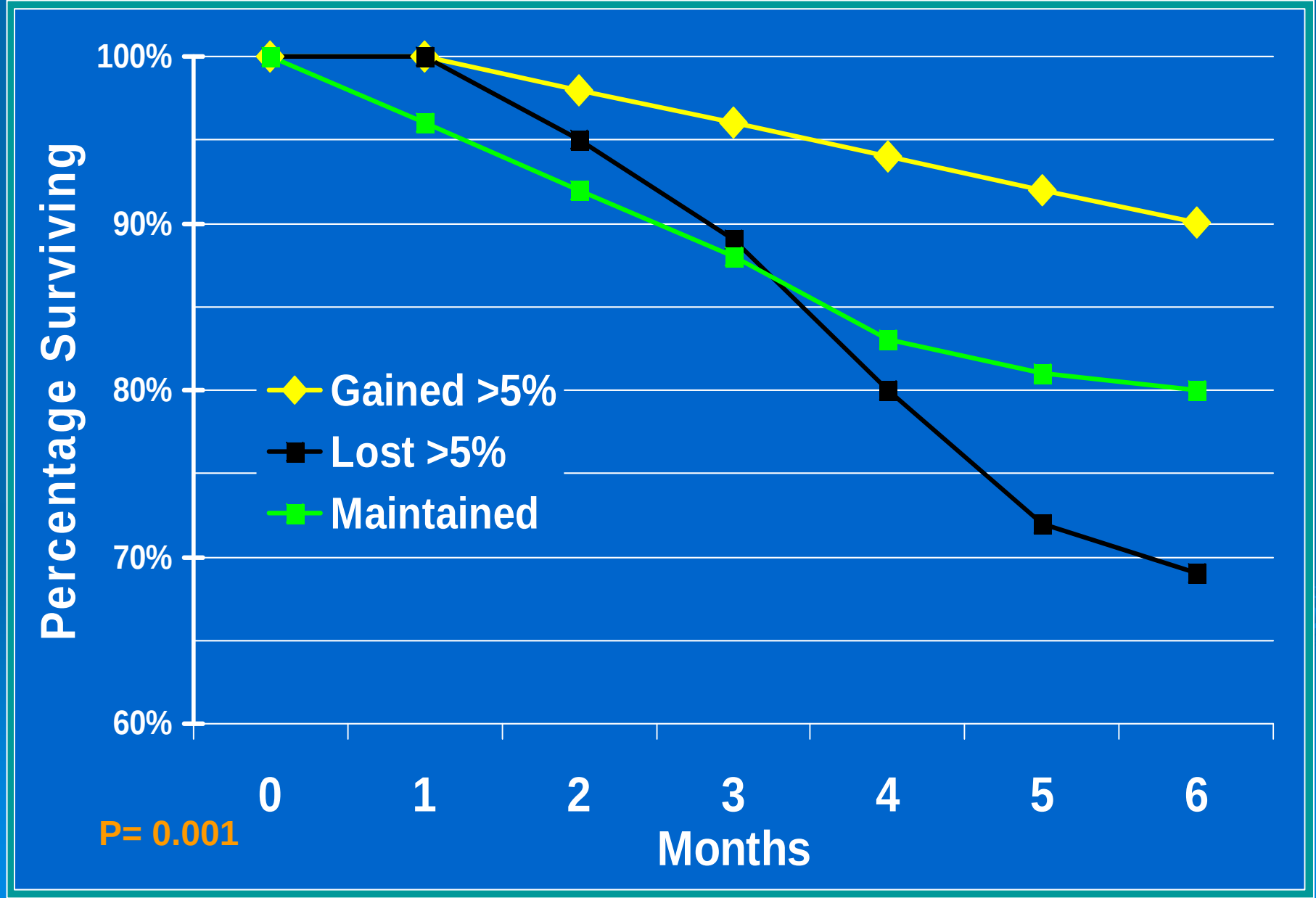
MNA® Screening Form (MNA-SF)

1. Has appetite & food intake declined in past 3 months?
2. Weight loss in past 3 months?
3. Mobility problems
4. Acute illness or major stress in past 3 months?
5. Neuropsychological problems: Dementia or depression
6. Body mass index (BMI) (kg/m^2)

Rubenstein LZ et al., J Gerontol 2001;56:M366-M372

Survival Curve

Weight Change: Baseline vs. Final Weight



Impact of Weight Loss

- Decline in functional status
- Increase in disability
- Predictor of hospital complications
- Increased mortality

Weight loss in an older person is a profound risk factor independent of initial body weight. Involuntary weight loss has an intensified effect on mortality risk, and is usually associated with clinical illness.

BMI and Mortality

- BMI <22: associated with:
  - ↑1 yr mortality rate
  - Poorer functional status in community dwelling elderly
  - Men 75+:BMI <20.5 → 20% higher mortality risk
  - Women 75+:BMI <18.5 →40% higher mortality risk
- BMI <20: a risk factor for in-hospital mortality

Cut-off of BMI is key

BMI < 18.5	NRS 2002
BMI < 20	MUST
BMI < 23	MNA

The Elderly are considered
at Nutritional Risk
with a BMI < 22 kg/m^2

Predictive ability of MNA ®

- One-year Mortality
- Correlates with functional level
- Good correlation with dietary intake :
  - energy, carbohydrate, fiber, calcium, vitamins D, B6, C, folate, iron
- Good correlation with biological parameters:
  - Albumin, prealbumin, transferrin, cholesterol, retinol, alpha-tocopherol, zinc, hemoglobin, hematocrit
- Predicts risk of malnutrition before changes seen in serum proteins in relatively healthy elderly
- Detects risk of malnutrition early ***before*** severe changes in weight

Why was the MNA® not used in Clinical Practice?

- Took too long time to complete
- Height &/or Weight not available
- Nutrition screening of elderly still not embedded in standard clinical practice
- Lack of awareness in clinical settings

MNA® International Initiative

- Provide an overview of MNA® use around the world
- Examine prevalence of malnutrition in the elderly in different settings worldwide
- **Test the validity of the original MNA®-SF in a larger international database**
- **Develop alternative version of the MNA®-SF for use when BMI is not available**
- **Create a scoring system for the MNA®-SF to classify nutritional status identical to full MNA®**
- **Make MNA®-SF more user-friendly and facilitate more widespread use in geriatric care**

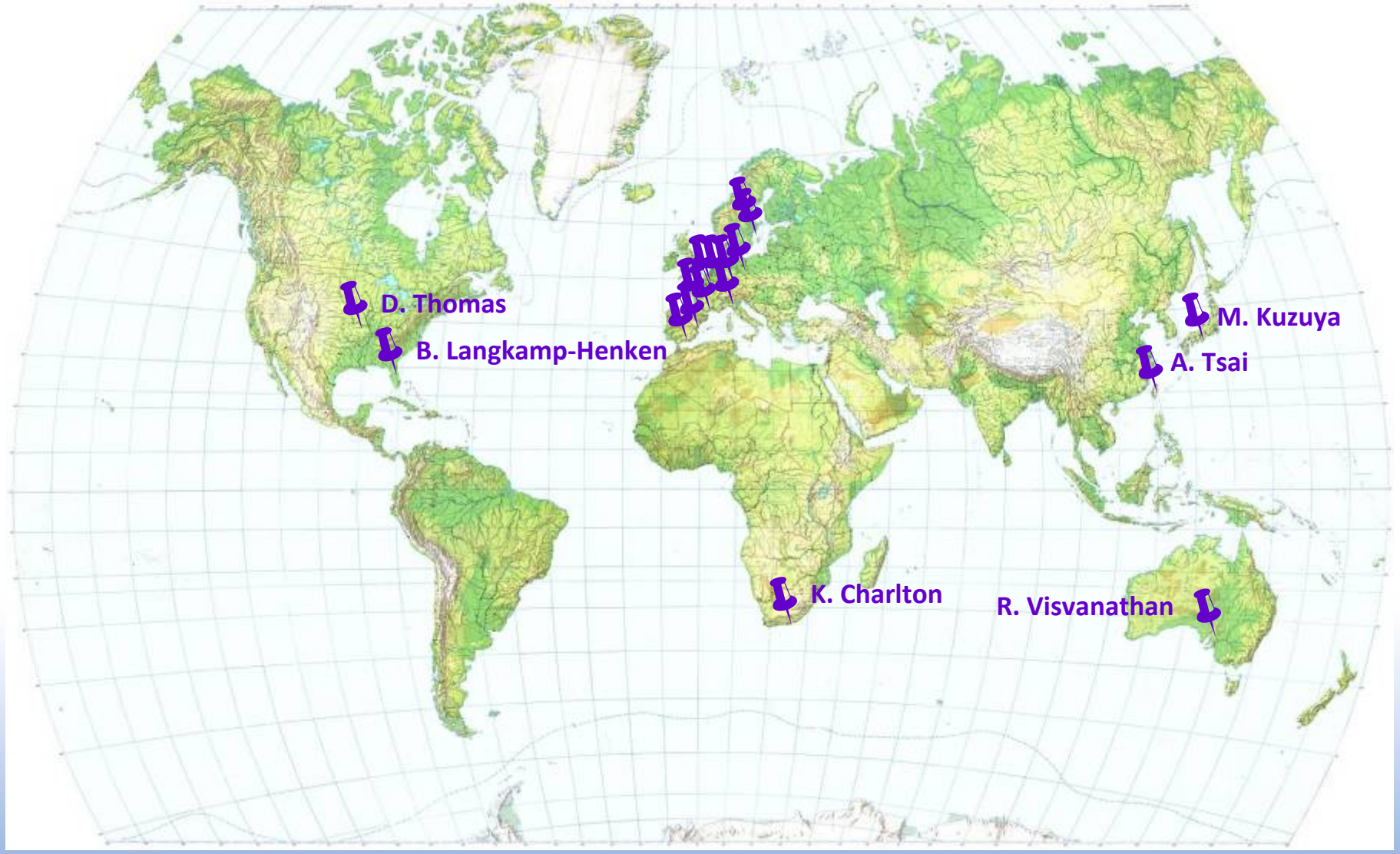
Work coordinated at Nuremberg University

Comprised of international group of experts and scientists in geriatrics

Methods

- Literature search identified studies on nutrition in geriatric medicine that used in the MNA®
- Studies published from 2000 through 2007
- Authors were asked to submit original datasets for pooled analyses
- 27 datasets (6257 study participants) from 24 authors

The 2008 – 2009 MNA® International Initiative



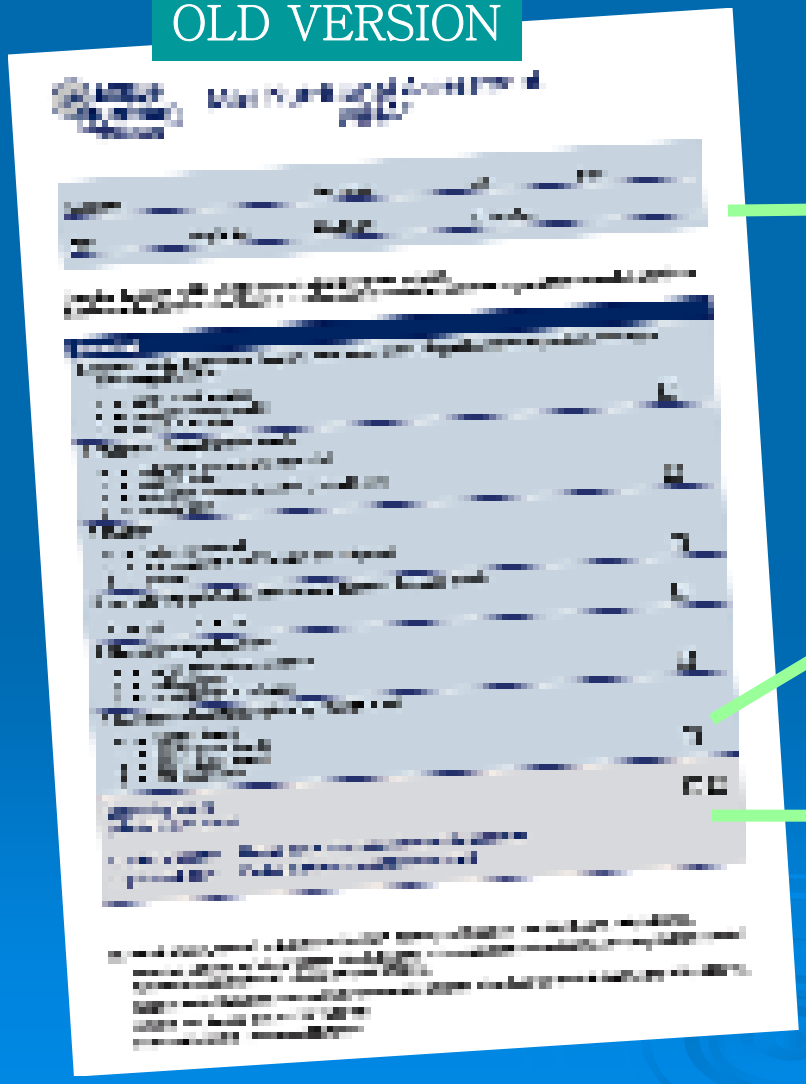
Best Question Combination – Compared to Full MNA®

Rank	Questions on MNA Form	Sensitivity	Specificity	Correlation with full MNA	Youden-Index
1	B-C-D-E-F-N	0.90	0.81	0.90	0.71
2	A-B-C-D-E-F (Original MNA-SF)	0.89	0.82	0.90	0.71
3	A-B-D-E-F-N	0.84	0.88	0.89	0.73

Bauer, et al. 2009, IANA

MNA® International Initiative
New MNA® Short Form

OLD VERSION



NEW VERSION

The MNA-Short Form has now been **validated as a stand alone tool** for screening of malnutrition.

"Calf Circumference" measurement is proposed as an alternative to BMI, when patient's weight and/or height are not available.

New cut-off points defined, to identify **Malnourished** vs. **At risk** vs. **Normally-nourished** patients after completing Short Form only, leading to **quicker nutritional intervention**

Why Substitute BMI with Calf Circumference?

- In some clinical settings, it is difficult to get weight and height measures

  (bed-bound persons, amputees)
- In some cultures, weight is not a common health measure
- Calf circumference is easy & quick option

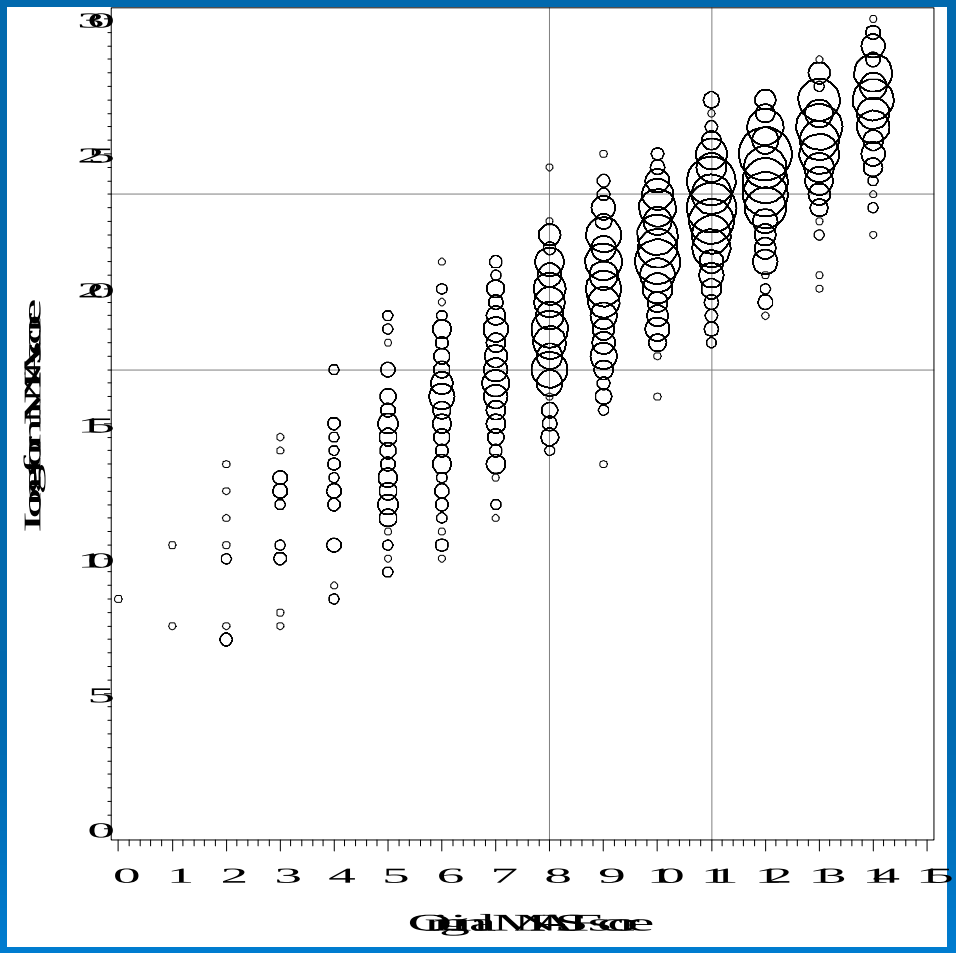
MNA®-SF Using Calf Circumference Measurements

Rank	Questions on MNA Forms	Sensitivity	Specificity	Spearman's correlation with long-form MNA	Youden-Index
1	B-C-D-E-N-R	0.86	0.84	0.86	0.70
2	A-B-C-D-E-R "CC-MNA-SF"*	0.85	0.84	0.86	0.70
3	A-B-D-E-N-R	0.80	0.90	0.86	0.70

**Calf Circumference question used instead of BMI*

Bauer, et al. 2009, IANA

MNA® -SF with BMI *vs.* Full MNA®



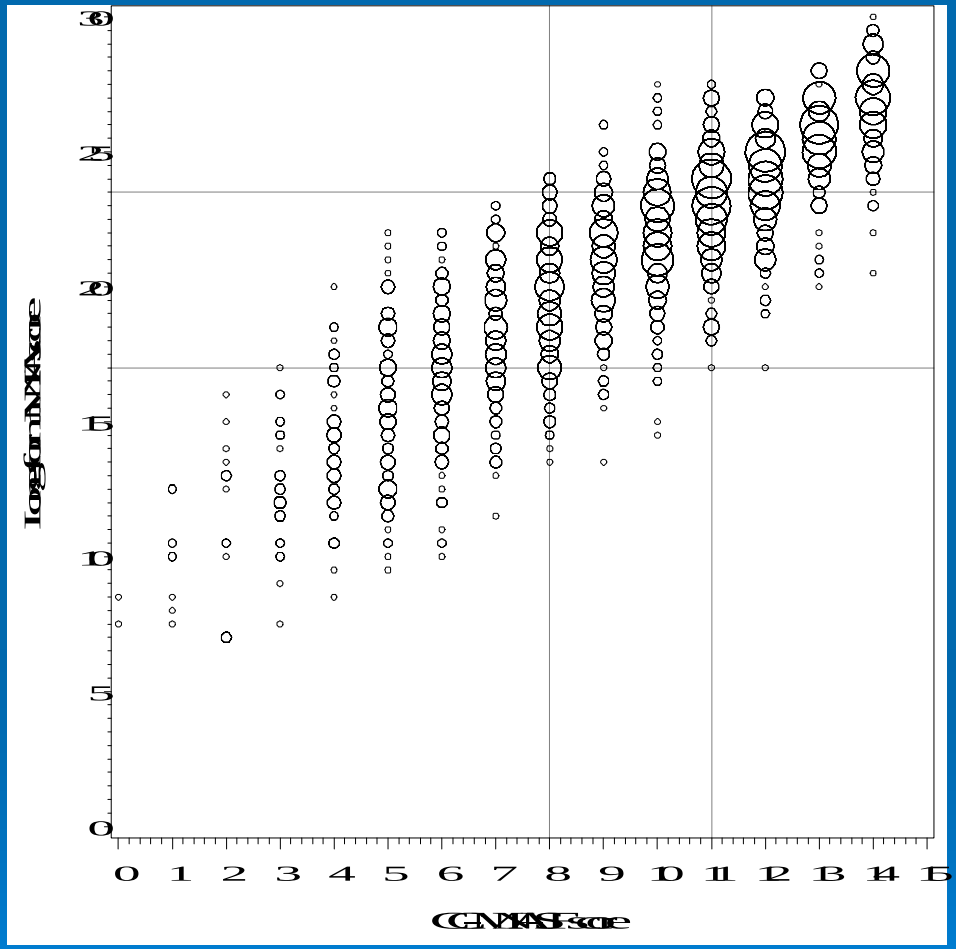
Correct classifications: 79.9%

No complete misclassifications by two categories

Vertical bars represent short-form cut-points; horizontal bars represent long-form cut-points.

Bauer et al, 2009

MNA® -SF with Calf Circumference *vs.* Full MNA®



Correct classifications: 72.9%

No complete misclassifications by two categories

Vertical bars represent short-form cut-points; horizontal bars represent long-form cut-points.

Bauer et al, 2009

Cut-off points for the MNA®-SF

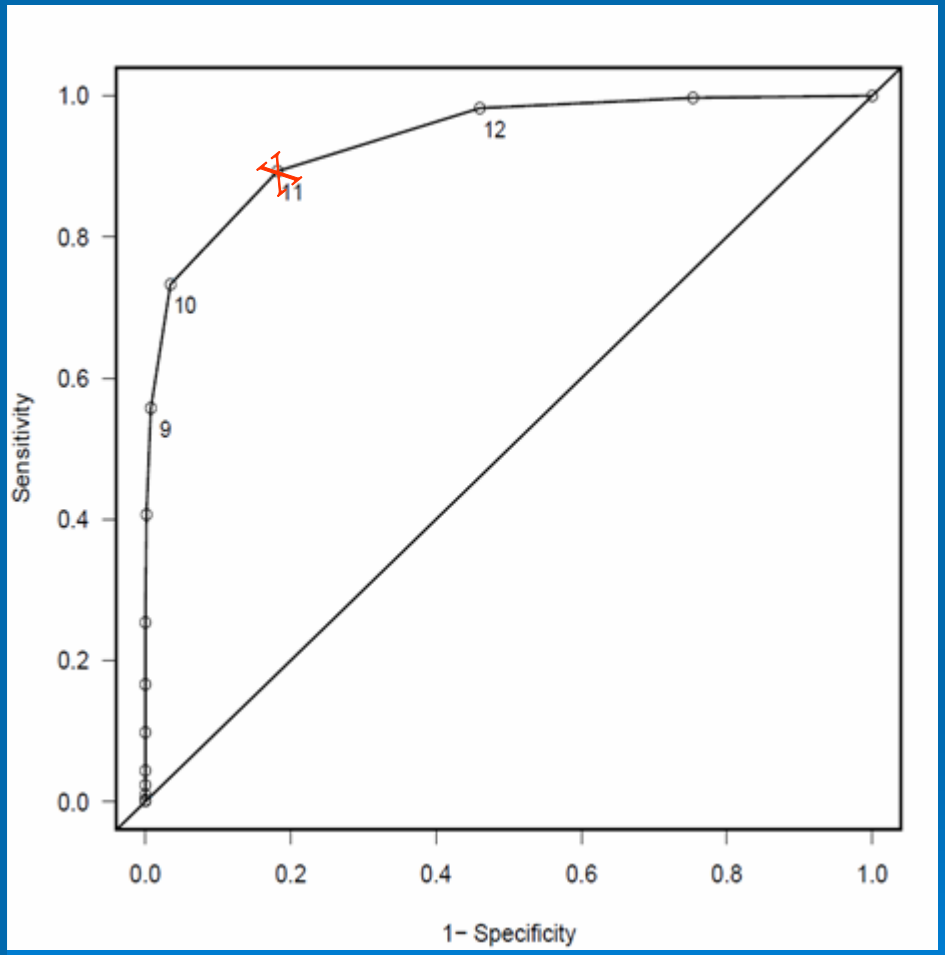
- Like the full MNA®, could the MNA®-SF distinguish between patients who were:

Malnourished

At risk for malnutrition

Well nourished

ROC Analysis for Upper Cut-point of MNA®-SF



Upper cut-point optimized for sensitivity

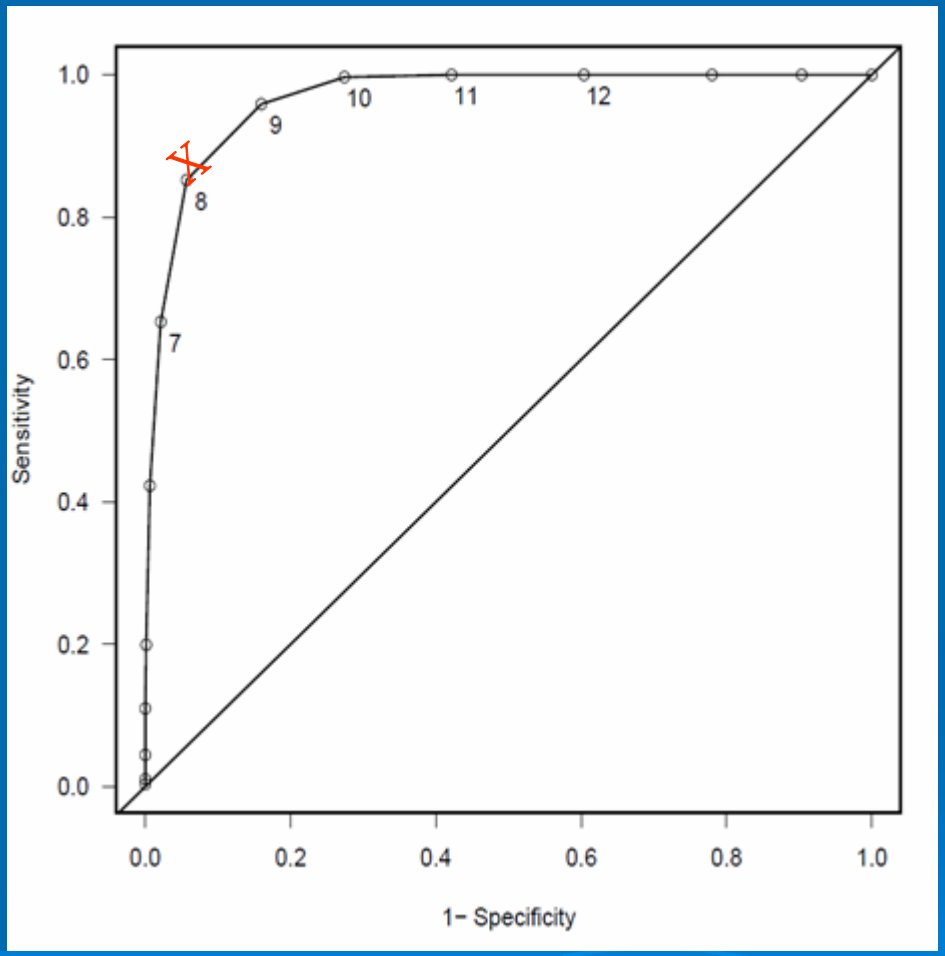
Used full MNA® as reference:

well-nourished vs. at risk/malnourished

Cut-point at eleven points: sensitivity 89.3%, specificity 81.8%, area under the curve 0.94

Bauer et al, 2009

ROC Analysis for Lower Cut-point of MNA® -SF



Lower cut-point optimized for specificity

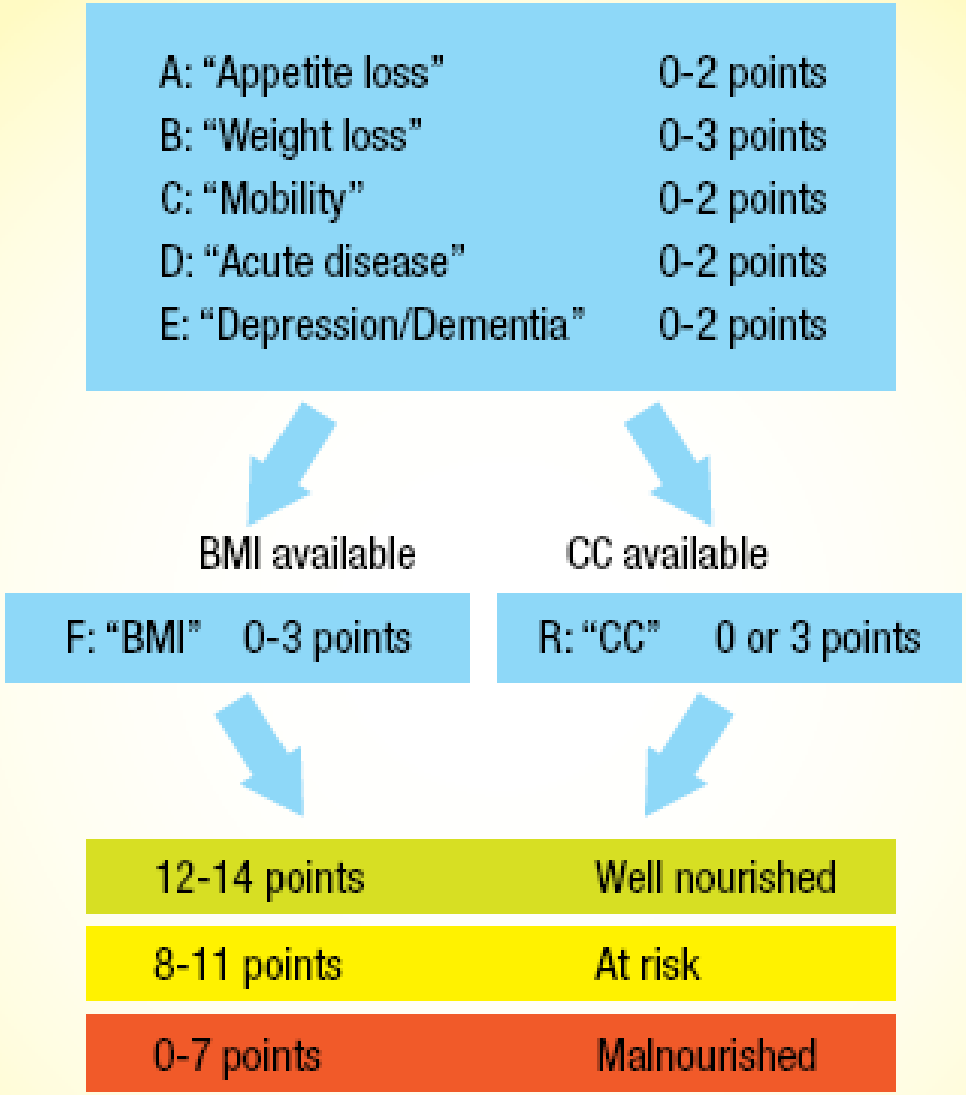
Used full MNA® as reference:

well-nourished/at risk vs. malnourished

Cut-point at eight points: sensitivity 85.2%, specificity 94.3%, area under the curve 0.97

Bauer et al, 2009

Figure 2. Scoring of the new MNA®-SF[3]



BMI, body mass index; CC, calf circumference

MNA® International Initiative Outcomes

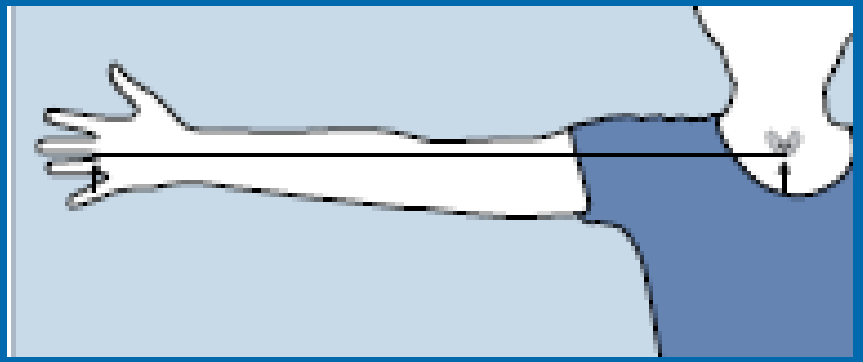
Drawbacks of old MNA-SF	*Outcomes of new MNA-SF*
Time consuming	Quick, stand-alone validated tool
Height and weight not always available	Calf-circumference valid alternative when height/weight unavailable
Did not identify malnourished without full MNA	3 cut-off points identify malnourished and allows direct movement from screening to intervention

A guide to completing the Mini Nutritional Assessment – Short Form (MNA®-SF)

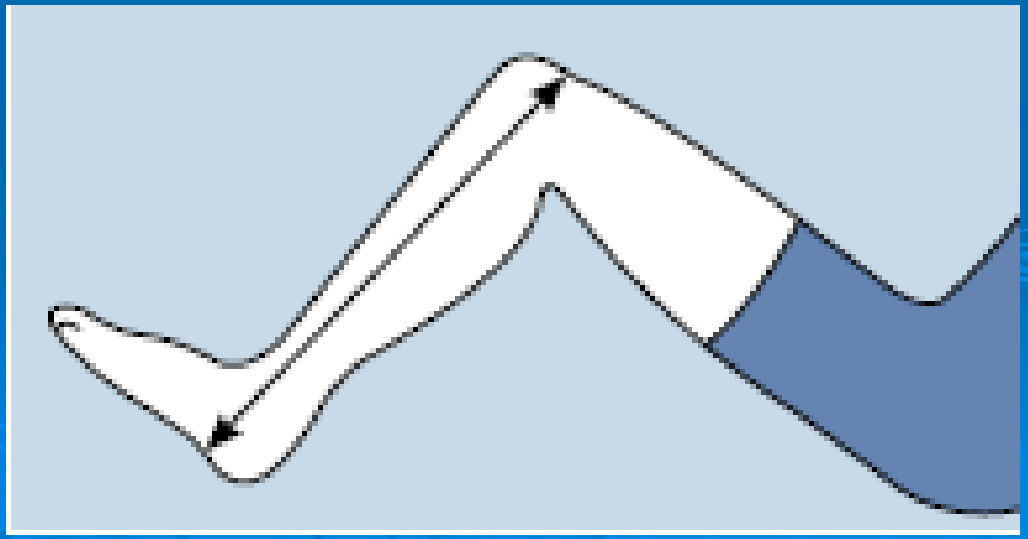
www.mna-elderly.com

Nestlé Nutrition INSTITUTE

Height Measurement

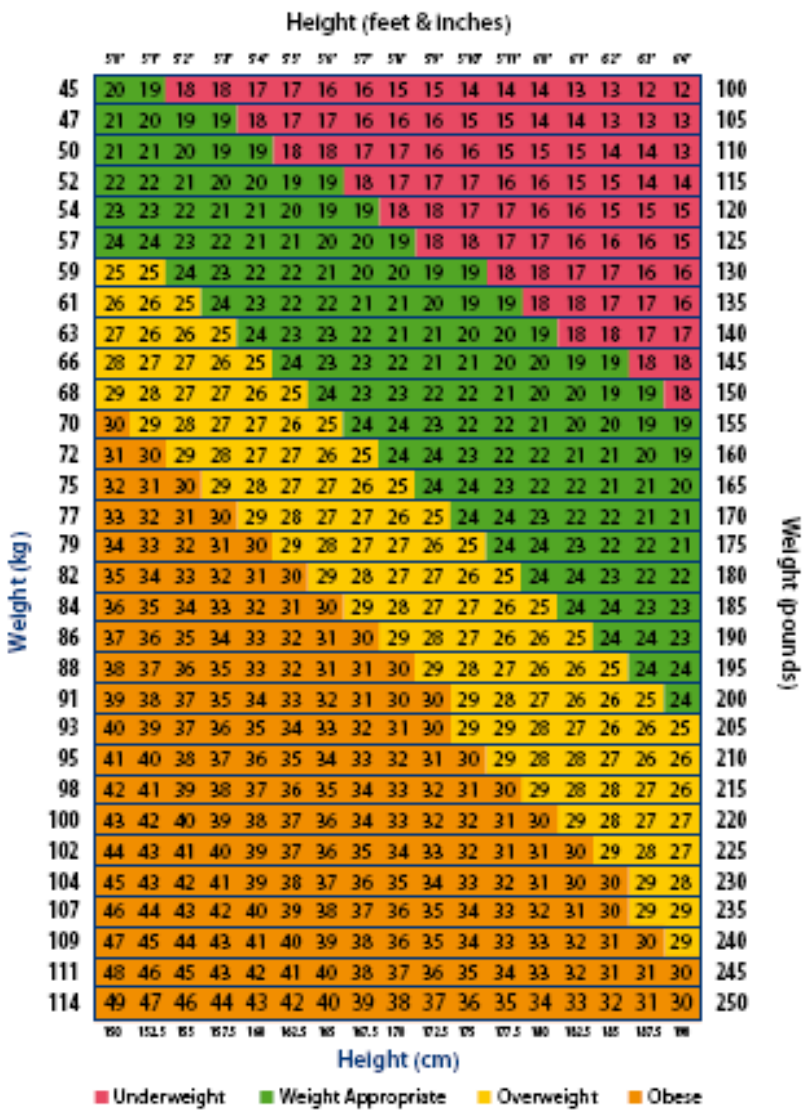


Demispan



Knee Height

Appendix 1 • Body Mass Index table



Source:

Adapted from Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults: The Evidence Report. National Institute of Health, National Heart Lung and Blood Institute

Measuring Calf Circumference
(in cm)

- Place subject sitting with left leg hanging loosely or standing with their weight evenly distributed on both feet
- Have them roll up their trouser leg to uncover calf
- Wrap tape measure around calf at a right angle at the widest part & take measurement
- Repeat above and below to ensure you have the widest part of calf

MNA ® -SF (Chinese)

Nestlé Nutrition INSTITUTE

Mini Nutritional Assessment MNA®

姓名: 性別:

年齡: 體重, 公斤, kg: 身高,公分, cm: 日期:

請於方格內填上適當的分數，將分數加總以得出最後篩選分數。

篩選

A 過去三個月內有沒有因爲食慾不振、消化問題、咀嚼或吞嚥困難而減少食量？
0 = 食量嚴重減少
1 = 食量中度減少
2 = 食量沒有改變 ☐

B 過去三個月內體重下降的情況
0 = 體重下降大於3公斤 (6.6磅)
1 = 不知道
2 = 體重下降1-3公斤 (2.2-6.6磅)
3 = 體重沒有下降 ☐

C 活動能力
0 = 需長期臥床或坐輪椅
1 = 可以下床或離開輪椅，但不能外出
2 = 可以外出 ☐

D 過去三個月內有沒有受到心理創傷或患上急性疾病？
0 = 有 2 = 沒有 ☐

E 精神心理問題
0 = 嚴重痴呆或抑鬱
1 = 輕度痴呆
2 = 沒有精神心理問題 ☐

F1 身體質量指數(BMI) (公斤 / 米², kg/m²)
0 = BMI 低於 19
1 = BMI 19至低於21
2 = BMI 21至低於23
3 = BMI 相等或大於 23 ☐

如不能取得身體質量指數(BMI)，請以問題F2代替F1。
如已完成問題F1，請不要回答問題F2。

F2 小腿圍 (CC) (公分, cm)
0 = CC 低於 31
3 = CC 相等或大於 31 ☐

篩選分數 (最高14分) ☐☐

12-14分: 正常營養狀況
8-11分: 有營養不良的風險
0-7分: 營養不良

如需要作深入營養評估，請完成 full MNA®，可於www.mna-elderly.com下載。

Ref. Vellas B, Villars H, Abellan G, et al. *Overview of the MNA® - Its History and Challenges.* J Nutr Health Aging 2006;10:456-465.
Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. *Screening for Undernutrition in Geriatric Practice: Developing the Short-Form Mini Nutritional Assessment (MNA-SF).* J. Geront 2001;56A: M366-377.
Guigoz Y. *The Mini-Nutritional Assessment (MNA®) Review of the Literature - What does it tell us?* J Nutr Health Aging 2006; 10:466-487.

如需更多資料: www.mna-elderly.com

MNA ® -Full Form (Chinese)

Nestlé Nutrition INSTITUTE

Mini Nutritional Assessment MNA®

姓名: 性別:

年齡: 體重, 公斤, kg: 身高,公分, cm: 日期:

請於方格內填上適當的分數以完成篩選，將篩選的分數加總，如分數相等於 11 分或以下，請繼續完成所有評估以得出「營養不良指標值」。

篩選

A 過去三個月內有沒有因爲食慾不振、消化問題、咀嚼或吞嚥困難而減少食量？
0 = 食量嚴重減少
1 = 食量中度減少
2 = 食量沒有改變 ☐

B 過去三個月內體重下降的情況
0 = 體重下降大於 3 公斤 (6.6 磅)
1 = 不知道
2 = 體重下降 1-3 公斤 (2.2-6.6 磅)
3 = 體重沒有下降 ☐

C 活動能力
0 = 需長期臥床或坐輪椅
1 = 可以下床或離開輪椅，但不能外出
2 = 可以外出 ☐

D 過去三個月內有沒有受到心理創傷或患上急性疾病？
0 = 有 2 = 沒有 ☐

E 精神心理問題
0 = 嚴重痴呆或抑鬱
1 = 輕度痴呆
2 = 沒有精神心理問題 ☐

F 身體質量指數 (BMI) (公斤 / 米², kg/m²)
0 = BMI 低於 19
1 = BMI 19 至低於 21
2 = BMI 21 至低於 23
3 = BMI 23 或以上 ☐

篩選分數 ☐☐
(最高 14 分)
12 分或以上 正常 – 沒有風險 – 毋須完成所有評估
11 分或以下 有可能營養不良 – 須繼續完成所有評估

評估

G 是否獨立生活 (非居住於療養院或醫院)？
1 = 是 0 = 否 ☐

H 每天服用三種以上的處方藥物？
0 = 是 1 = 否 ☐

I 是否有褥瘡或皮膚潰瘍？
0 = 是 1 = 否 ☐

J 每天吃多少次主餐？
0 = 1 餐
1 = 2 餐
2 = 3 餐 ☐

K 蛋白質攝取量指標
- 每天進食至少一 份乳製品 (牛奶、芝士或乳酪) 是 ☐ 否 ☐
- 每週進食兩份以上乾豆類或蛋類 是 ☐ 否 ☐
- 每天均進食肉類、魚類或家禽類 是 ☐ 否 ☐

0.0 = 0 或 1 個 [是]
0.5 = 2 個 [是]
1.0 = 3 個 [是] ☐☐

L 每天有進食兩份或以上水果或蔬菜？
0 = 否 1 = 是 ☐

M 每天喝多少流質 (水、果汁、咖啡、茶、牛奶....)？
0.0 = 少於 3 杯
0.5 = 3 至 5 杯
1.0 = 多於 5 杯 ☐☐

N 進食模式
0 = 需輔助才能進食
1 = 能自行進食但稍有困難
2 = 能自行進食 ☐

O 自我評估營養狀況
0 = 自覺營養不良
1 = 不清楚自我的營養狀況
2 = 自覺沒有營養問題 ☐

P 與同齡人士相比，病人如何評價自己的健康狀況？
0.0 = 比別人差
0.5 = 不知道
1.0 = 和別人一 樣
2.0 = 比別人更好 ☐☐

Q 上手臂中點臂圍 (MAC) (公分, cm)
0.0 = MAC 低於 21
0.5 = MAC 21 至低於 22
1.0 = MAC 22 或以上 ☐☐

R 小腿圍 (CC) (公分, cm)
0 = CC 低於 31
1 = CC 31 或以上 ☐

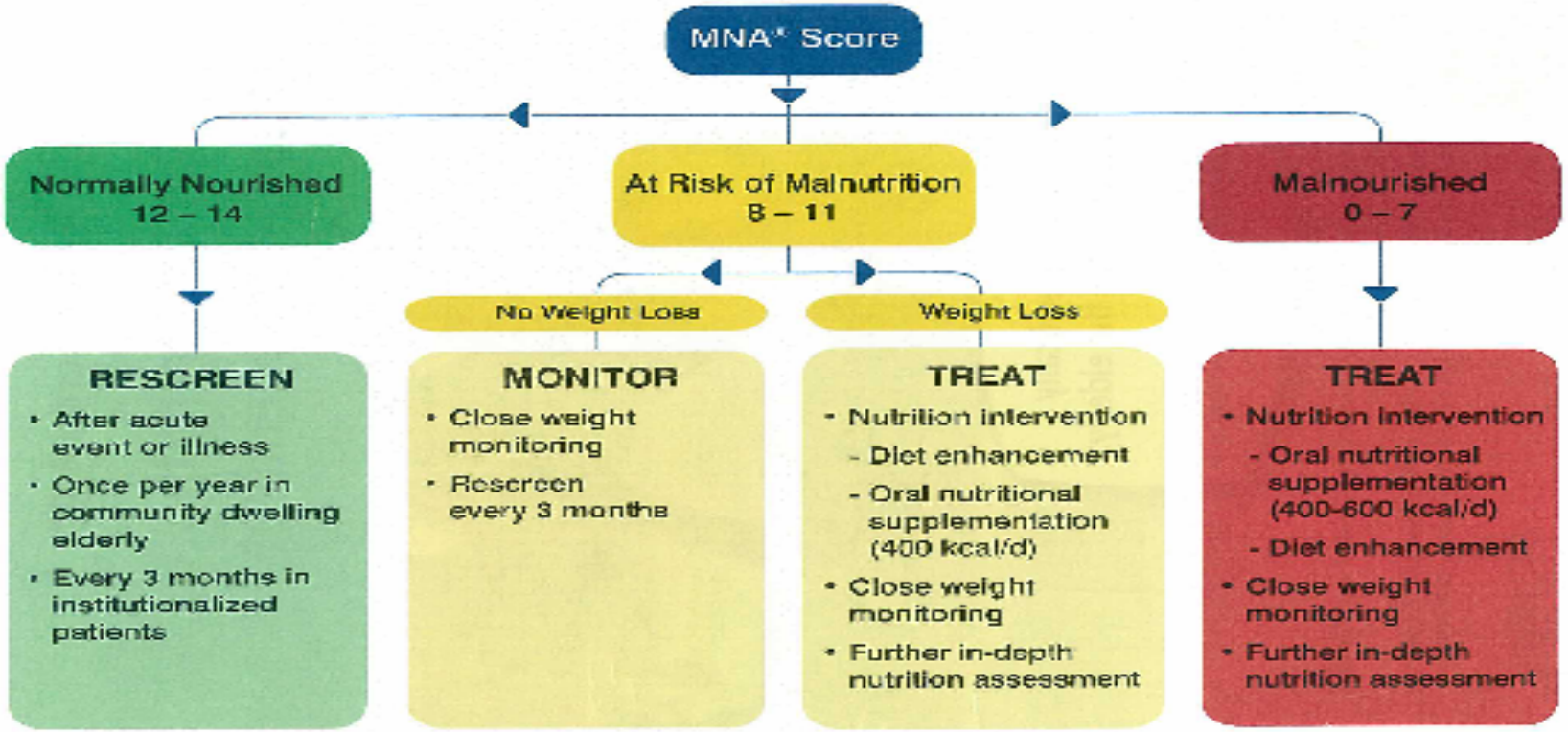
評估分數 (最高 16 分) ☐☐☐
篩選分數 ☐☐☐
總評估分數 (最高 30 分) ☐☐☐

「營養不良指標值」
總評估分數 17 至 23.5 分 ☐ 有營養不良的風險
總評估分數少於 17 分 ☐ 營養不良

Ref. Vellas B, Villars H, Abellan G, et al. *Overview of MNA® - Its History and Challenges.* J Nut Health Aging 2006; 10: 456-465.
Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. Screening for Undernutrition in Geriatric Practice: *Developing the Short-Form Mini Nutritional Assessment (MNA-SF).* J. Geront 2001; 56A: M366-377.
Guigoz Y. The Mini-Nutritional Assessment (MNA®) *Review of the Literature – What does it tell us?* J Nutr Health Aging 2006; 10: 466-487.

如需更多資料: www.mna-elderly.com

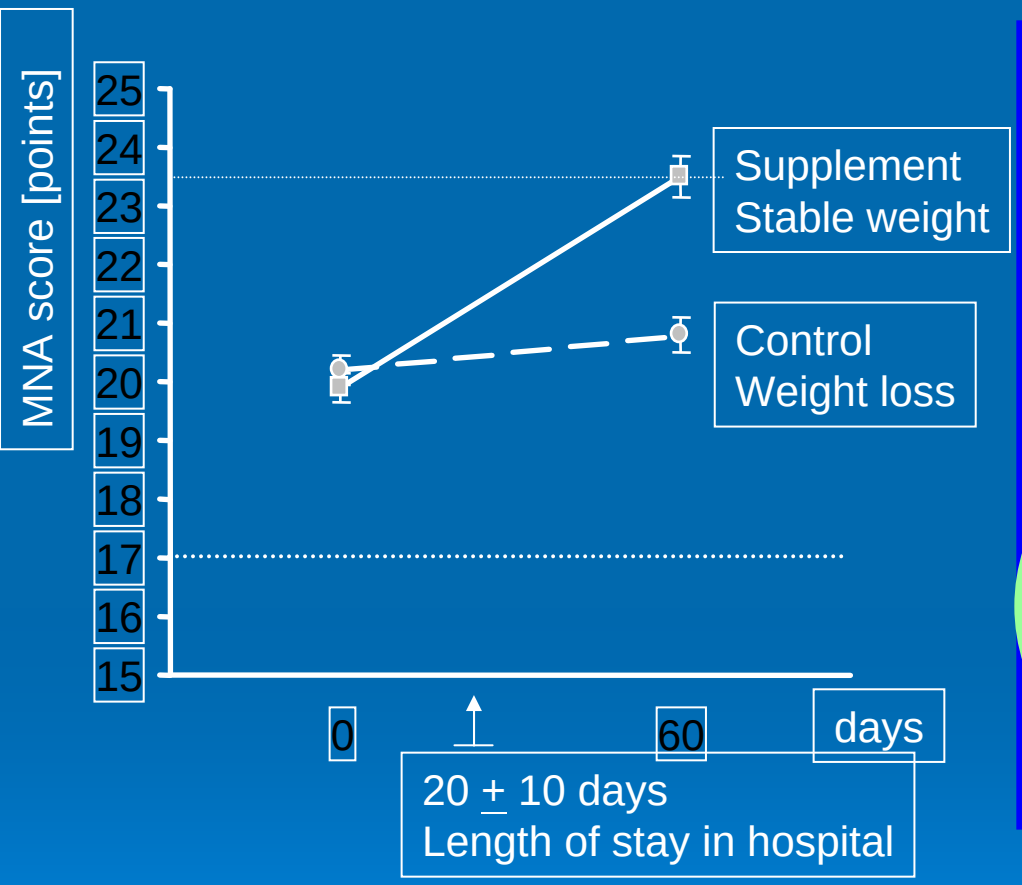
Recommendations for Intervention



"The ability of the new MNA®-SF to provide identical result categories, which are in high agreement with the full MNA®, allows for quicker nutrition intervention"

J Bauer, MNA Proceedings IAGG 2009

Nutrition Intervention prevents wt loss



- 80 patients;75+ year old, at risk of malnutrition (MNA< 23.5).
- 2 month oral supplementation
- 2 servings/d→ 500 kcal / 21g pro

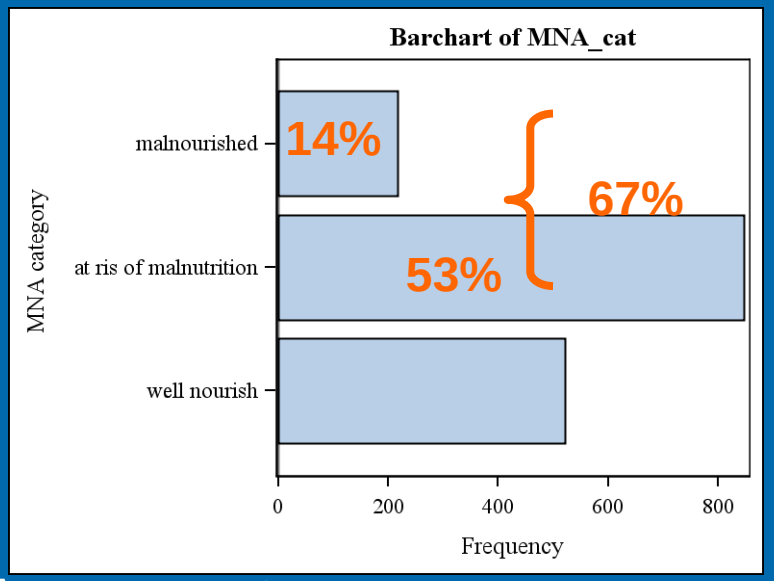
Conclusion:

Use of daily oral supplementation during & after hospitalization maintains body wt and ↑ MNA score in patients at risk of malnutrition

Gazzotti C et al., Age & Ageing 2003;32:321-325

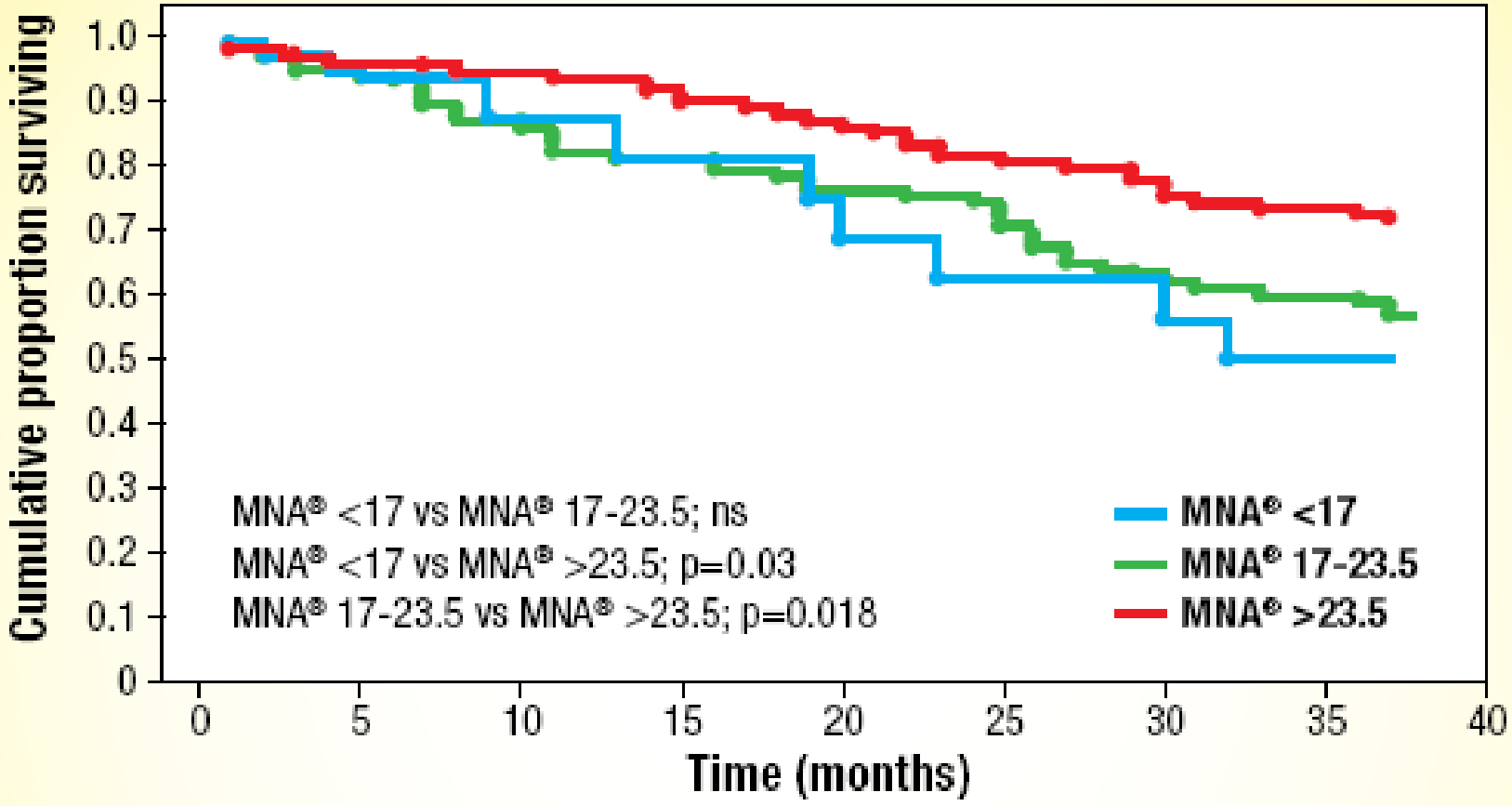
MNA® use in Long-term Care

- Ideal for use in long-term care
  - Population 65+
  - High risk of nutritional problems



- Should be part of nursing admission history
  - Routine part of Comprehensive Geriatric Assessment
  - Electronic medical record
- Routine screening by dietitians and geriatrians
- Should be repeated frequently
  - Well Nourished: every 3 months
  - At risk: every 3 months unless signs of weight loss
  - Malnourished: monthly

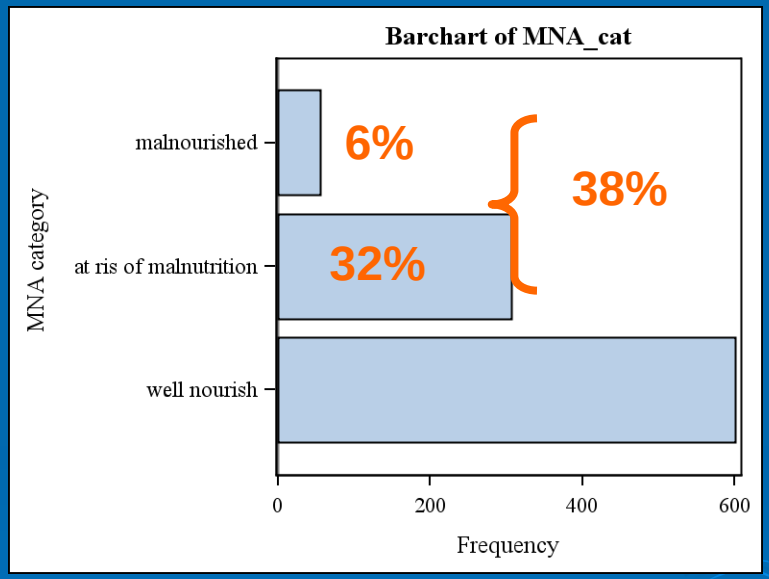
Figure 4. MNA® and survival[5]



MNA®, Mini Nutritional Assessment

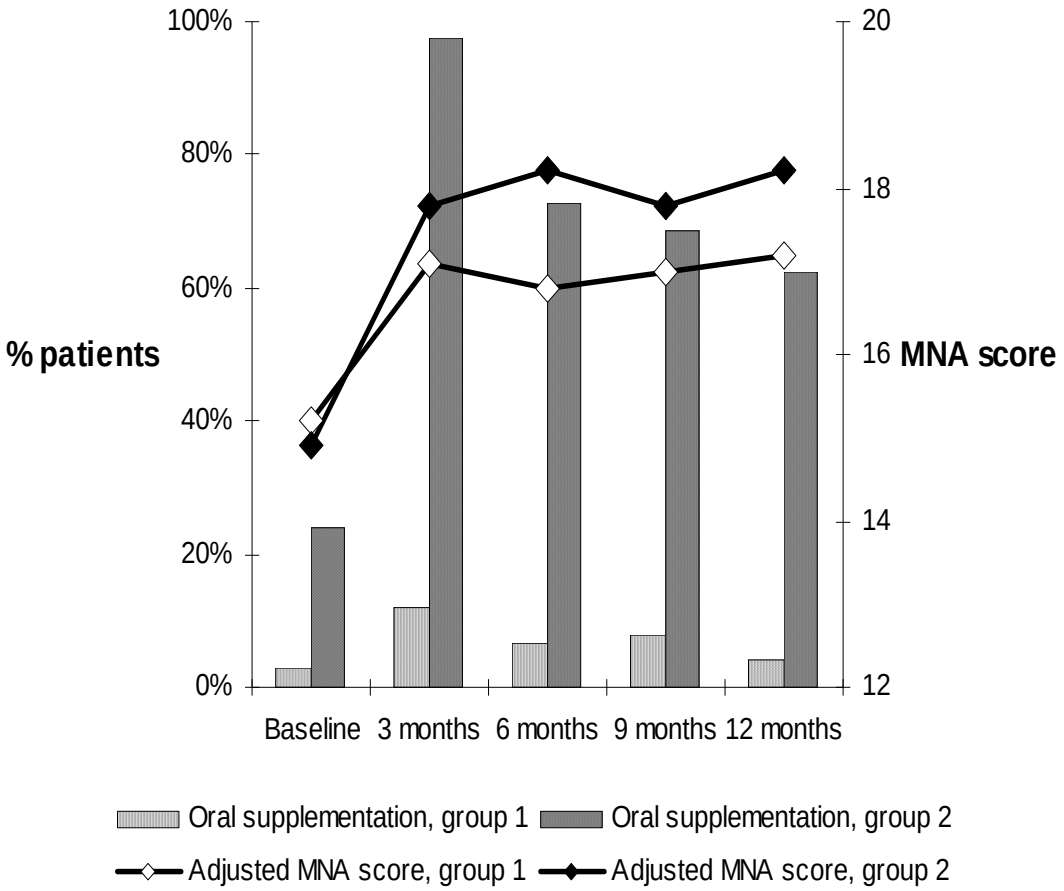
MNA® in Community Care

- Easy to use for community nurses, dietitians and family doctors
- Good tool to use at health fairs to raise awareness of nutrition issues in elderly
- Lower prevalence of nutritional risk



- Study done in community physicians demonstrated rise in MNA in malnourished elderly

Adjusted nutritional status as a function of time & ONS



- Observational, prospective, cohort study with a 12 month follow up in 90 practitioners in France
- Two groups of MDs selected on historical prescribing practice
- Group 1 = low freq use of ONS
- Group 2 = high freq use of ONS
- Higher % patients with higher MNA scores and on ONS in Group 2 over time

Arnaud-Battandier, et al, Clin Nutr 2004

Case study- Mrs. Lee

- Mrs. Lee is a 75-year-old widow with 2 children.
- She is now living in a nursing home. She can feed herself with some assistance by the nursing aid.
- She has fair appetite and has lost about 1.5 kg in the past 3 months
- Her current weight is 48 kg and her height is 158 cm with BMI of 19.2.
- She is partially mobile and requires the use of wheelchair since she had a stroke about 1 year ago.
- She has stable mood with no major illness and mental problems in the past 3 months

Nestlé Nutrition INSTITUTE

Mini Nutritional Assessment MNA®

姓名: 性別:

年齡: 體重, 公斤, kg: 身高,公分, cm: 日期:

請於方格內填上適當的分數，將分數加總以得出最後篩選分數。

篩選

A 過去三個月內有沒有因爲食慾不振、消化問題、咀嚼或吞嚥困難而減少食量?
0 = 食量嚴重減少
1 = 食量中度減少
2 = 食量沒有改變 ☐

B 過去三個月內體重下降的情況
0 = 體重下降大於3公斤 (6.6磅)
1 = 不知道
2 = 體重下降1-3公斤 (2.2-6.6磅)
3 = 體重沒有下降 ☐

C 活動能力
0 = 需長期臥床或坐輪椅
1 = 可以下床或離開輪椅，但不能外出
2 = 可以外出 ☐

D 過去三個月內有沒有受到心理創傷或患上急性疾病?
0 = 有 2 = 沒有 ☐

E 精神心理問題
0 = 嚴重痴呆或抑鬱
1 = 輕度痴呆
2 = 沒有精神心理問題 ☐

F1 身體質量指數(BMI) (公斤/米², kg/m²)
0 = BMI 低於 19
1 = BMI 19至低於21
2 = BMI 21至低於23
3 = BMI 相等或大於 23 ☐

如不能取得身體質量指數(BMI)，請以問題F2代替F1。
如已完成問題F1，請不要回答問題F2。

F2 小腿圍 (CC) (公分, cm)
0 = CC 低於 31
3 = CC 相等或大於 31 ☐

篩選分數 (最高14分) ☐☐

12-14分: 正常營養狀況
8-11分: 有營養不良的風險
0-7分: 營養不良

如需要作深入營養評估，請完成 full MNA®，可於www.mna-elderly.com下載。

Ref. Vellas B, Villars H, Abellan G, et al. *Overview of the MNA® - Its History and Challenges.* J Nutr Health Aging 2006;10:456-465.
Rubenstein LZ, Harker JO, Salva A, Guigoz Y, Vellas B. *Screening for Undernutrition in Geriatric Practice: Developing the Short-Form Mini Nutritional Assessment (MNA-SF).* J. Geront 2001;56A: M366-377.
Guigoz Y. *The Mini-Nutritional Assessment (MNA®) Review of the Literature - What does it tell us?* J Nutr Health Aging 2006; 10:466-487.

如需更多資料: www.mna-elderly.com

Case study- Mrs. Lee

She has fair appetite in the past 3 months → 1

She has lost about 1.5 kg in the past 3 months → 2

She is partially mobile and requires the use of wheelchair → 1

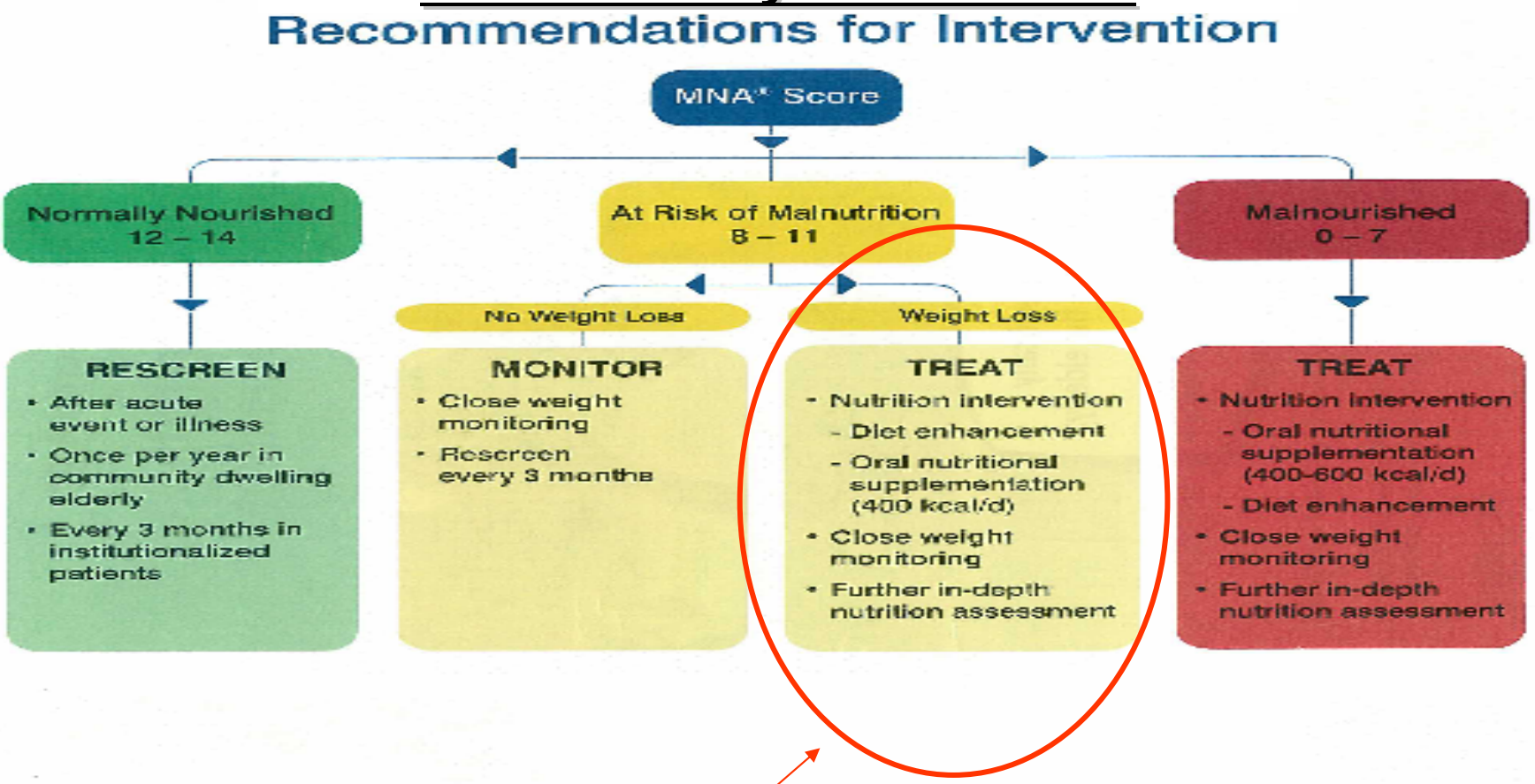
She has stable mood with no major illness in the past 3 months → 2

She has no major mental health problems in the past 3months → 2

Her current BMI is 19.2 → 1

Total score = 9 out of 14
= at risk of malnutrition

Case study- Mrs. Lee



1. Total score = 9 out of 14
   = at risk of malnutrition
2. Weight loss of 1.5 kg in the past 3 months

File Edit View Favorites Tools Help

Back Search Favorites Media

Address http://www.mna-elderly.com/ Go Links

www.mna-elderly.com

Search

- OVERVIEW
- The Problem - Malnutrition
- Causes of Malnutrition
- Identifying Malnutrition - MNA®
- MNA® FORMS
- HEALTH CARE PROFESSIONALS
- RESEARCH
- MNA® FEEDBACK
- OTHER LINKS

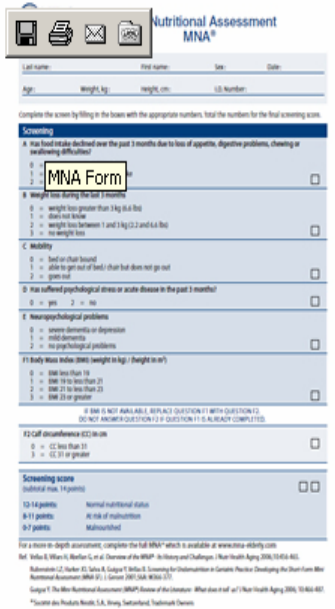
Overview

What is the MNA®?

The MNA® is a validated nutrition screening and assessment tool that can identify geriatric patients age 65 and above who are malnourished or at risk of malnutrition.

What is the latest news about the MNA®?

Recent research presented in July at the IAGG congress in Paris has resulted in the launch of a new, revised MNA® Short Form. This new MNA® Short Form is now validated as a stand-alone tool. Calf circumference has also been determined to be a valid alternative when BMI is not available. The new **MNA® Short Form** now also classifies the elderly as well-nourished, at risk, or malnourished vs completion of the full MNA® for nutritional status classification. These changes to the MNA® Short Form facilitate its use across care settings and make it much more user friendly.



Find more information on this new research below.

- JNHA article
- News release
- IANA abstract
- ESPEN abstract

New MNA® Video

Nutrition screening as easy as the MNA

- click here -

MNA® Webinars

Experience presentations from the revised MNA-SF researchers as if you were there

Clinical Program, IAGG 2009 Paris

http://www.mna-elderly.com/forms/mini/mna_mini_english.pdf

Internet

Start Desktop My Computer 09:06

IAGG 2009 proceedings

The MNA® revisited: what does the data tell us?

Chairmen:
Professor Bruno Vellas (Toulouse, France),
Professor Cornel Sieber (Nuremberg, Germany)

Scientific Symposium Proceedings

XIXth IAGG World Congress of Gerontology and Ge

Monday, 6 July 2009
Paris, France

State of the Art and Research for Malnutrition in the Elderly

Chairmen: Antonio Salvà (Barcelona, Spain) &
Eva Topinková (Prague, Czech Republic)

Scientific Symposium Proceedings
XIXth IAGG World Congress of Gerontology a

Wednesday, 8 July 2009
Paris, France

Nutrition and Functionality: "Key Partners in Ageing"

Chairman: Professor Heike Bischoff-Ferrari

Proceedings from the Nestlé Nutrition Institute Satellite Symposium at the XIXth IAGG World Congress of Gerontology and Geriatrics

Tuesday, 7 July 2009
Paris, France

Nestlé Nutrition INSTITUTE

The Journal of Nutrition, Health & Aging©
Volume 13, Number 9, 2009

VALIDATION OF THE MINI NUTRITIONAL ASSESSMENT SHORT-FORM (MNA®-SF): A PRACTICAL TOOL FOR IDENTIFICATION OF NUTRITIONAL STATUS

M.J. KAISER[1], J.M. BAUER[1], C. RAMSCH[2], W. UTER[2], Y. GUIGOZ[3], T. CEDERHOLM[4], D.R. THOMAS[5], P. ANTHONY[3], K.E. CHARLTON[6], M. MAGGIO[7], A.C. TSAI[8], D. GRATHWOHL[9], B. VELLAS[10], C.C. SIEBER[1] FOR THE MNA-INTERNATIONAL GROUP*

1. Institute for the Biomedicine of Aging, Friedrich-Alexander University Erlangen-Nürnberg, Heimerichstrasse 58, 90419 Nuremberg, Germany; 2. Department of Medical Informatics, Biometry and Epidemiology, Friedrich-Alexander University Erlangen-Nürnberg, Waldstrasse 6, Erlangen, Germany; 3. Nestlé Nutrition/HealthCare Nutrition, Rte des Avouillons 30, CH-1196 Gland, Switzerland; 4. Clinical Nutrition and Metabolism, Department of Public Health and Caring Sciences, Uppsala University, Uppsala Science Park, 75185 Uppsala, Sweden; 5. Division of Geriatric Medicine, Saint Louis University Health Sciences Center, Saint Louis, MO 63104, USA; 6. School of Health Sciences, Faculty of Health and Behavioural Sciences, University of Wollongong, Northfields Avenue, Wollongong, NSW 2522, Australia; 7. Department of Internal Medicine and Biomedical Sciences, Section of Geriatrics, University Hospital of Parma, Parma, Italy; 8. Graduate Institute of Long-Term Care, Department of Healthcare Administration, Asia University, Wufeng, Taichung 41354, Taiwan, ROC; 9. Nestlé Research Center, Vers-chez-les-Blancs, CH-1000 Lausanne 26, Switzerland; 10. Department of Geriatrics, INSERM U 558, Toulouse University Hospital Center, 31300 Toulouse, France. * Collaborators: Bai J, Donini LM, Dumarthersy EW, Ilhan AC, Ezzed NH, Gómez Ramos MJ, Heseker H, Kaiser R, Krieg MA, Kumyo M, Langkamp-Henken B, Lauer S, Magri F, Norman K, Ödlund Olin A, Overnier S, Pahor-Eichelkraut S, Pauly L, Pepersack T, Pirlich M, Reinhart W, Rolland Y, Ruiz López MD, Sieglitz C, Schneider SM, Stehle P, Strathmann S, Visvanathan R, Volkert D, Wirnitzer K.

Abstract: *Objective:* To validate a revision of the Mini Nutritional Assessment short-form (MNA®-SF) against the full MNA, a standard tool for nutritional evaluation. *Methods:* A literature search identified studies that used the MNA for nutritional screening in geriatric patients. The contacted authors submitted original datasets that were merged into a single database. Various combinations of the questions on the current MNA-SF were tested using this database through combination analysis and ROC based derivation of classification thresholds. *Results:* Twenty-seven datasets (n=6257 participants) were initially processed from which twelve were used in the current analysis on a sample of 2032 study participants (mean age 82.3y) with complete information on all MNA items. The original MNA-SF was a combination of six questions from the full MNA. A revised MNA-SF included calf circumference (CC) substituted for BMI performed equally well. A revised three-category scoring classification for this revised MNA-SF, using BMI and/or CC, had good sensitivity compared to the full MNA. *Conclusion:* The newly revised MNA-SF is a valid nutritional screening tool applicable to geriatric health care professionals with the option of using CC when BMI cannot be calculated. This revised MNA-SF increases the applicability of this rapid screening tool in clinical practice through the inclusion of a "malnourished" category.

Key words: Mini Nutritional Assessment, short-form, weight, body mass index, calf circumference, elderly.

Introduction

The Mini Nutritional Assessment (MNA®) is a short, valid nutritional screening tool for free-living and clinically relevant elderly populations (1, 2). The MNA contains geriatric-specific assessment questions related to nutritional and health conditions, independence, quality of life, cognition, mobility and subjective health (3). The MNA is recommended for routine geriatric assessments by the European Society for Clinical Nutrition and Metabolism (ESPEN) (4). The MNA is easily completed within 10 to 15 minutes time (1, 2), but the MNA is used infrequently in some acute care settings due in part to the time needed to complete it (3, 5). To reduce this short time burden further, Rubenstein and colleagues developed a six question MNA short-form (MNA-SF) by identifying a subset of questions from the full MNA that had high sensitivity, specificity and correlation to the full MNA (5). This original MNA-SF identifies elderly individuals as well nourished or at risk of malnutrition so that the full MNA is needed only if a patient is classified as at risk. The diagnostic accuracy of this original MNA-SF in identifying the elderly as well nourished is comparable to the full MNA, and it can be a valid time saving alternative.

The clinical utility of the MNA and MNA-SF is challenged by several short screening tools such as the Malnutrition Universal Screening Tool (MUST) (6), the Short Nutritional Assessment Questionnaire (SNAQ) (7) and the Nutritional Risk Screening 2002 (NRS) (8). The merits of these short screening tools have been discussed previously (9), but these short, rapid screens are specifically not designed for clinical use in geriatric medicine. However they are frequently applied to some elderly patients because they are short, quick and easy to use.

Many nutritional and geriatric assessment/screening tools require the body mass index (BMI) including the full MNA. In some clinical and free living settings, measuring weight and height for the BMI can be time-consuming particularly in bedridden and immobile elderly patients. Also, in some Asian and African populations, weight and thus BMI are not common health measures (10). Calf circumference (CC) and mid-arm circumference (MAC) are possible alternatives to BMI because they can be taken easily with a tape measure, and they are also part of the full MNA (11). With the exception of a nutrition screening tool for South African elderly that includes only MAC (10), there are no screening instruments for the elderly

Received August 25, 2009
Accepted for publication September 21, 2009

Kaiser et al. Clin Nutr 4(suppl 2):113; 2009

Take home messages

- Malnutrition is highly prevalent in the elderly population
- A recent international database reconfirms that the original MNA®-SF is a well validated screening tool and can be used standing alone.
- When BMI cannot be obtained, calf circumference may be substituted to complete the 6-item MNA®-SF
- The MNA® remains the most well validated and primary nutrition screening tool for the elderly.
- Nutrition intervention prevents morbidity and mortality in the elderly.

Thank you

謝謝

Nestlé Nutrition Institute (NNI)

The Nestlé Nutrition Institute (NNI) fosters

"Science for better Nutrition"

.. because we are convinced that innovative, science-based nutrition can help enhance the quality of people's lives all over the world

Our activities focus on information sharing, education and training

Nutrition screening

As easy as mna®

The MNA® (Mini Nutritional Assessment) is the most validated screening tool for the elderly. Quick, easy to use and effective, the MNA® was designed to address the nutrition aspects of the Comprehensive Geriatric Assessment.

Most validated tool for the elderly
- Sensitive and reliable
- Recommended by national and international organisations
- Supported by more than 400 published studies

Quick and easy to use
- Screen in less than 4 minutes
- Requires no special training

Effective
- Identifies at-risk persons before weight loss occurs
- Facilitates early intervention

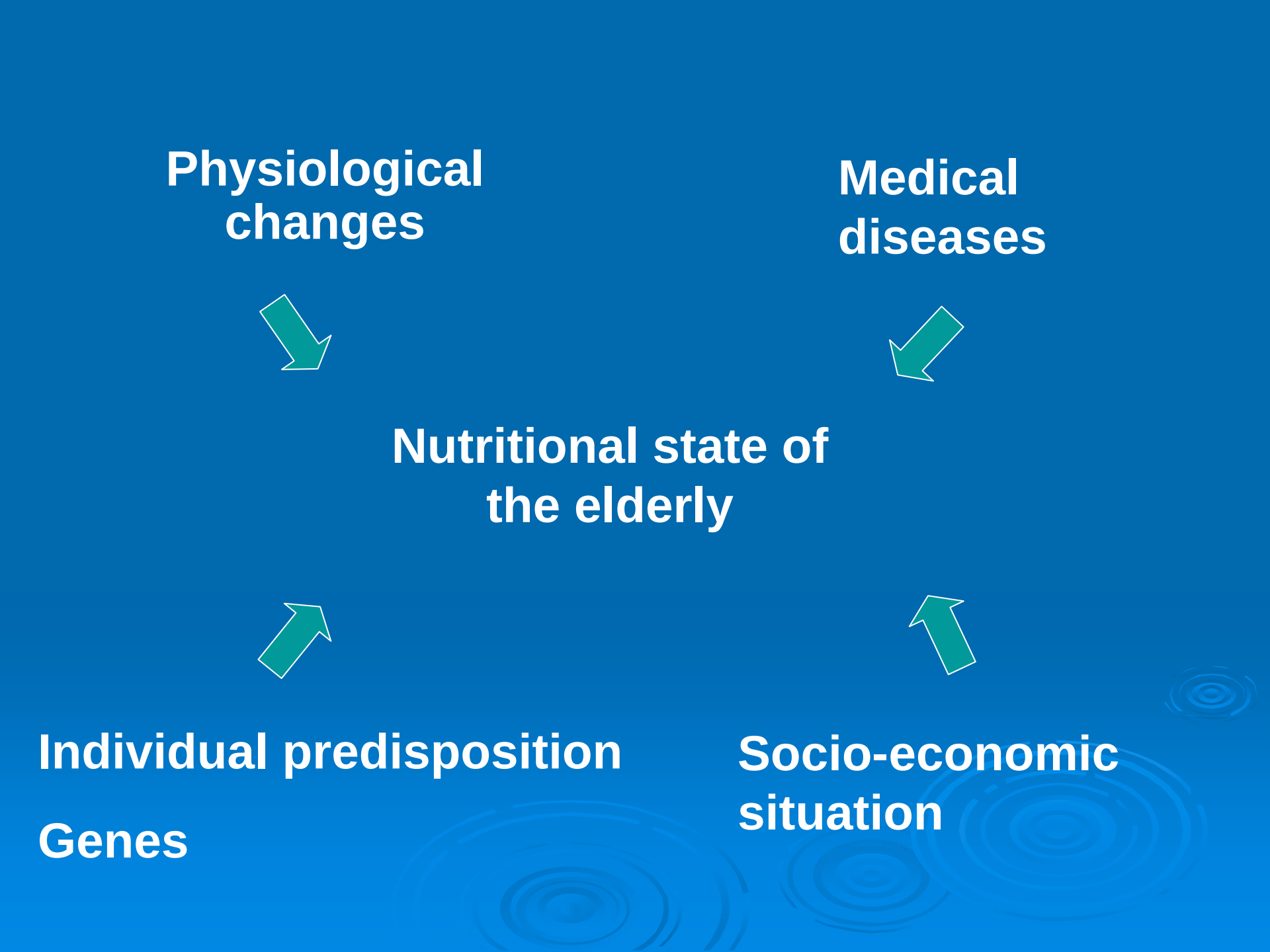
www.mna-elderly.com
Visit our new,
re-designed website

Nestlé Nutrition INSTITUTE

What are the physiological changes with aging?

- Changes in Body Composition
  - Declining muscle mass
  - Increasing fat mass
  - Declining bone density
- Changes in Cognitive Function
- Immunosenescense
  - Less effective immune system
  - Chronic low grade inflammation

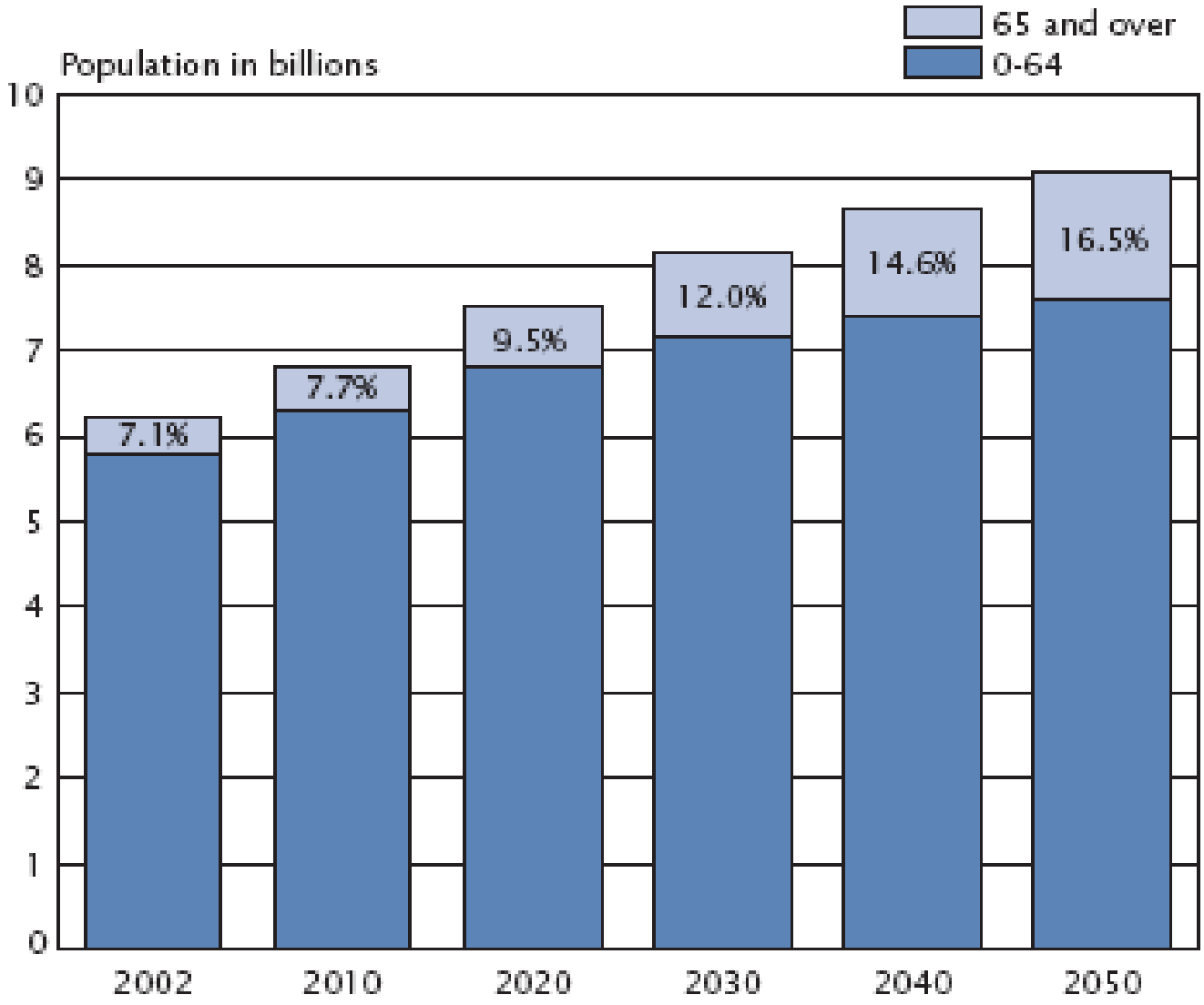

100 JAHRE
NA UND?


Physiological changes
Medical diseases
Nutritional state of the elderly
Individual predisposition
Genes
Socio-economic situation

Global Elderly Population Compared to Total Population: 2002-2050

The number of elderly is expected to grow very rapidly during the coming five decades.

DOUBLE



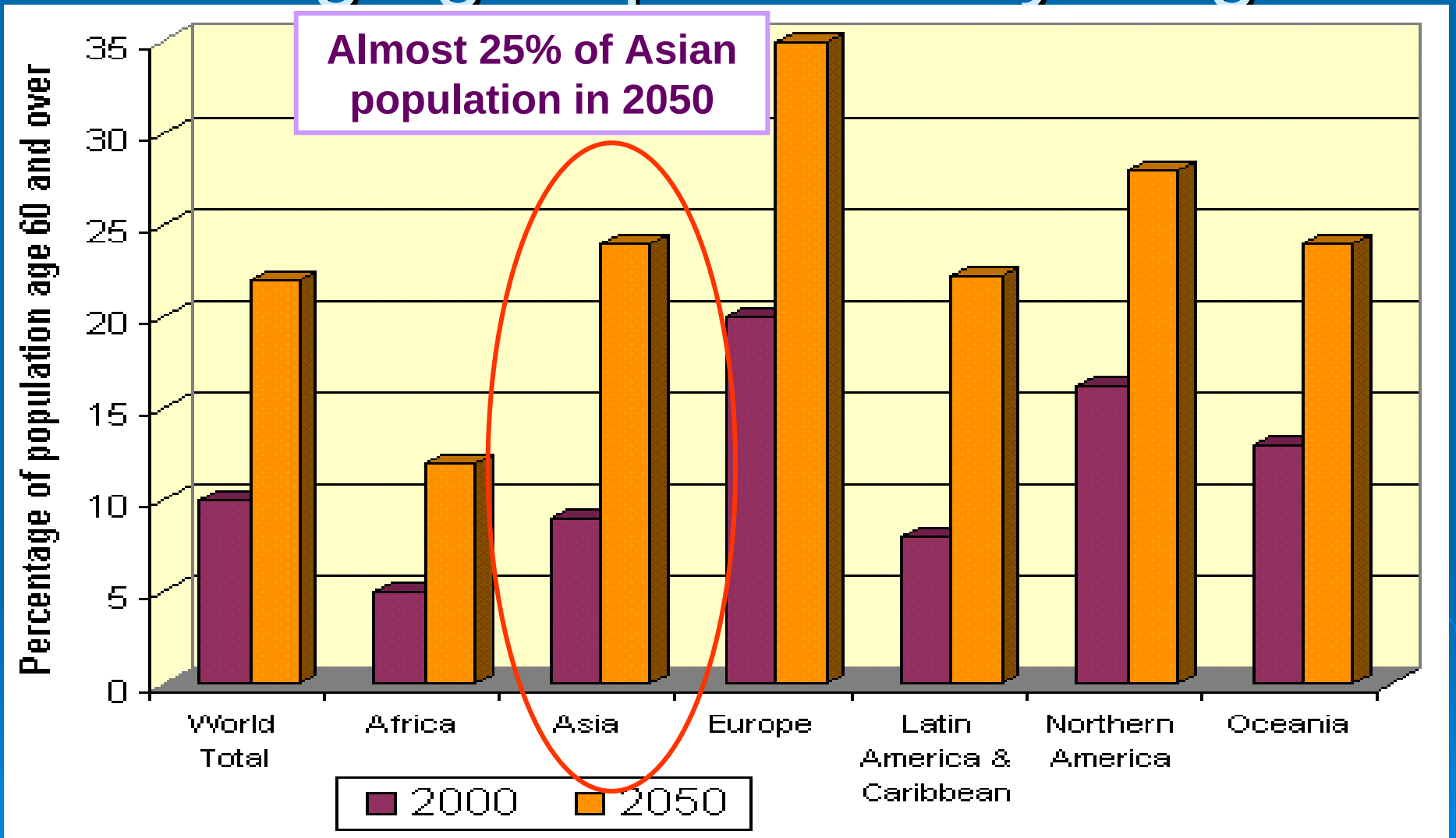
Source: U.S. Census Bureau, International Programs Center, International Data Base.

Global population 65+:

- 2000 - 606 Million
- 2050 – 1.9 Billion

16.5% of population by 2050

The Aging Population by Region



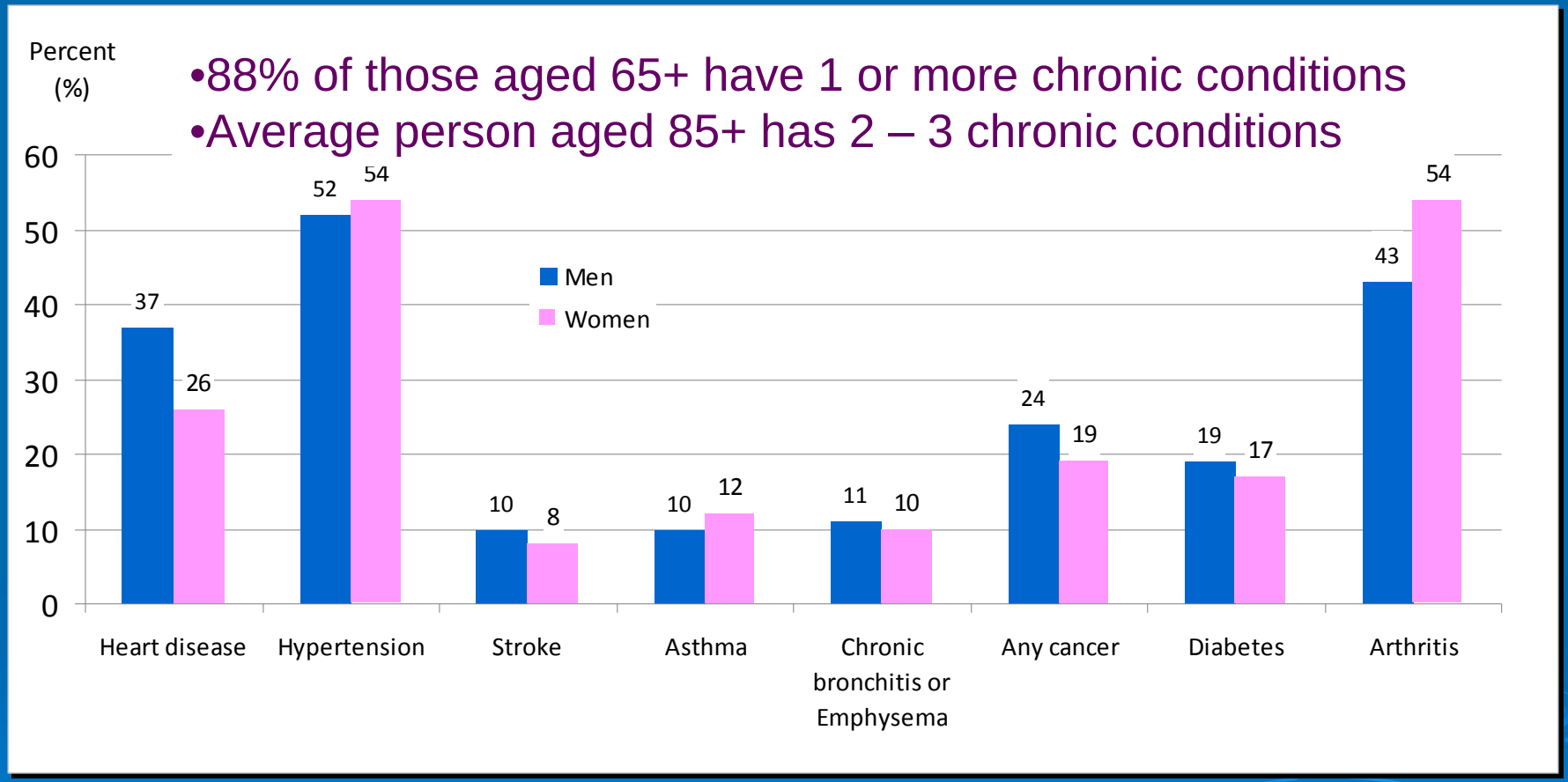
Source: World Population Prospects, The 1998 Revision, Volume II: Sex and Age. The Population Division, Department of Economic and Social Affairs, United Nations Secretariat

Life expectancy in Asia

- Average life expectancy in many Asian countries is > 70 years while the world average is 67.2 years
  - Rank #1 - Japan has the highest overall life expectancy – 82.6 years
  - Rank #2 – Hong Kong – 82.2 years
  - Rank #15 – Singapore – 80.0 years
  - Rank # 52 – Taiwan – 78.0 year
  - Rank # 65 - Malaysia -74.2 years
  - Rank # 100 - Philippines – 71.1 years
  - Rank # 110 – Indonesia – 70.7 years
  - Rank #111- Thailand – 70.6 years

United Nations (2005-2010)
CIA world factbook 2009

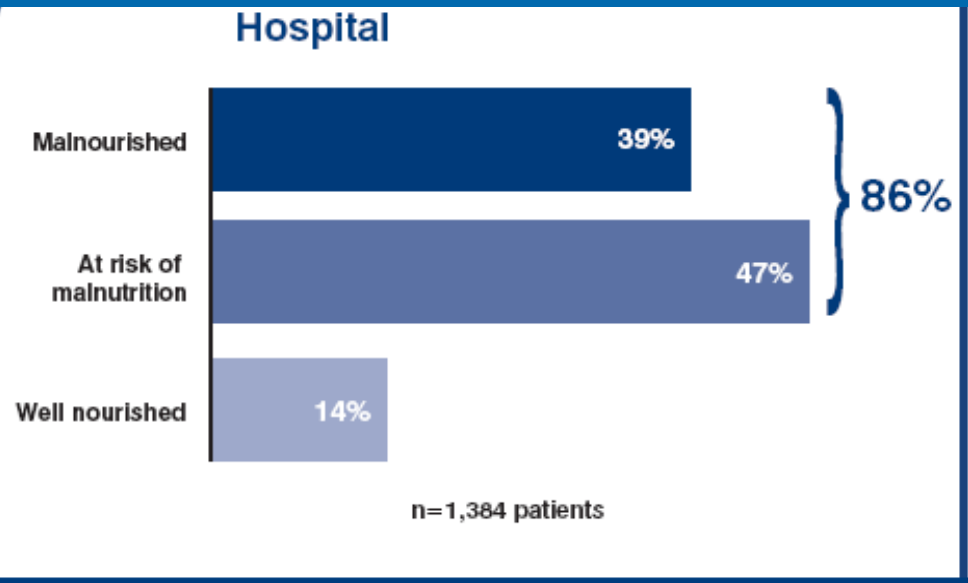
Chronic Disease and Malnutrition

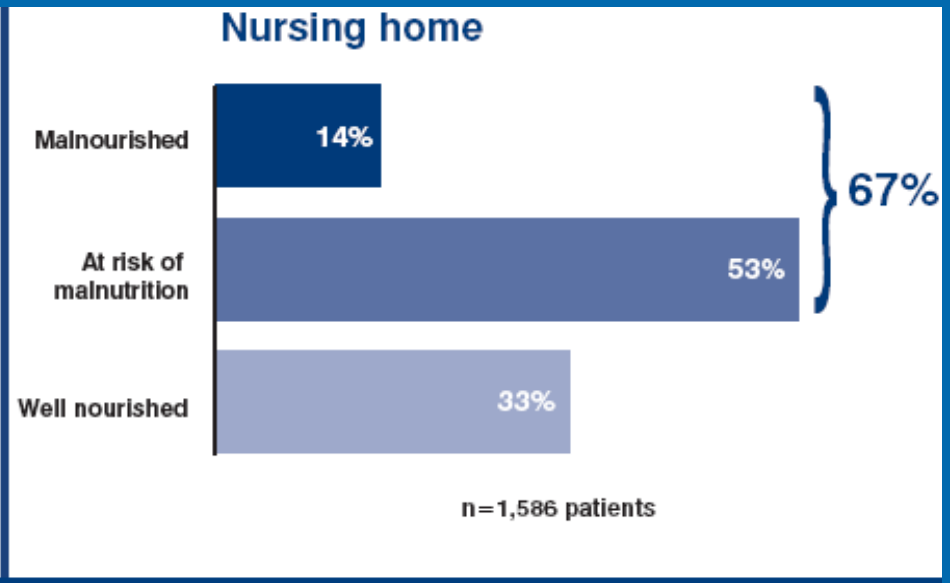


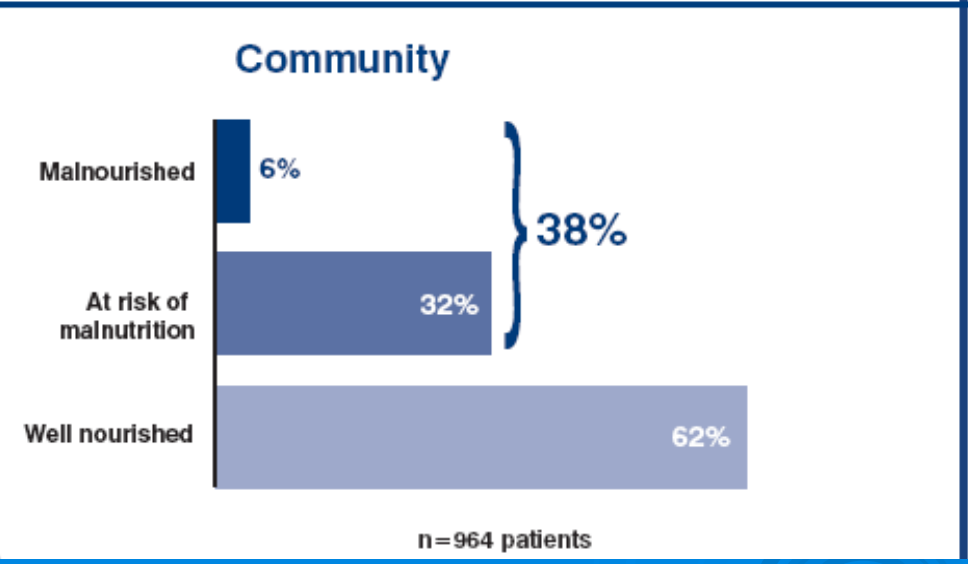
Malnutrition :

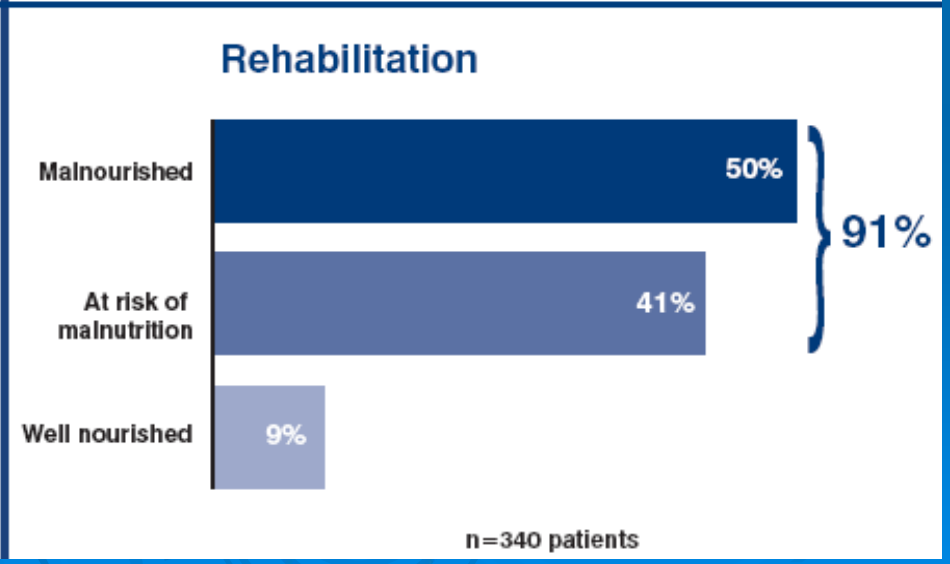
- **A common consequence of chronic disease**
- **38% of community dwelling elderly are at risk of malnutrition or malnourished**

Malnutrition in the Elderly





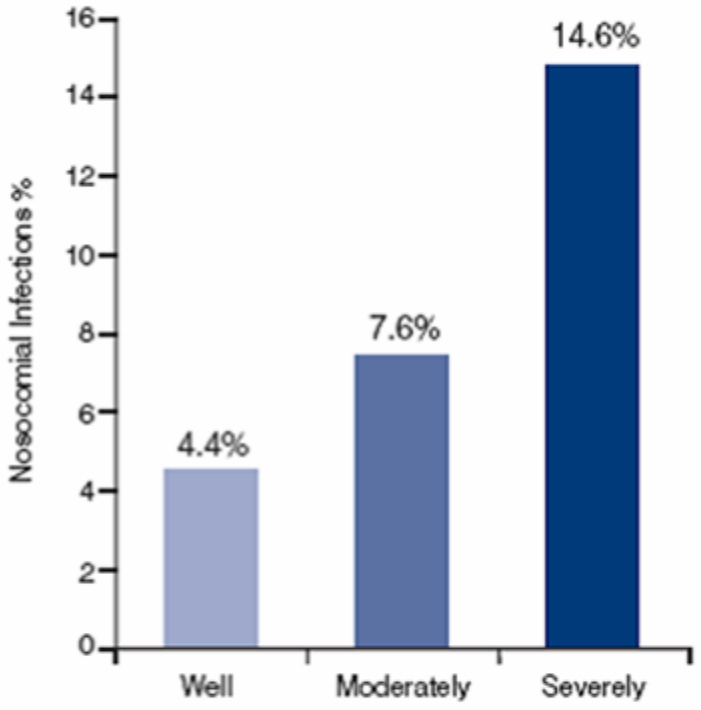




Kaiser et al. Clin Nutr 4(suppl 2):113; 2009

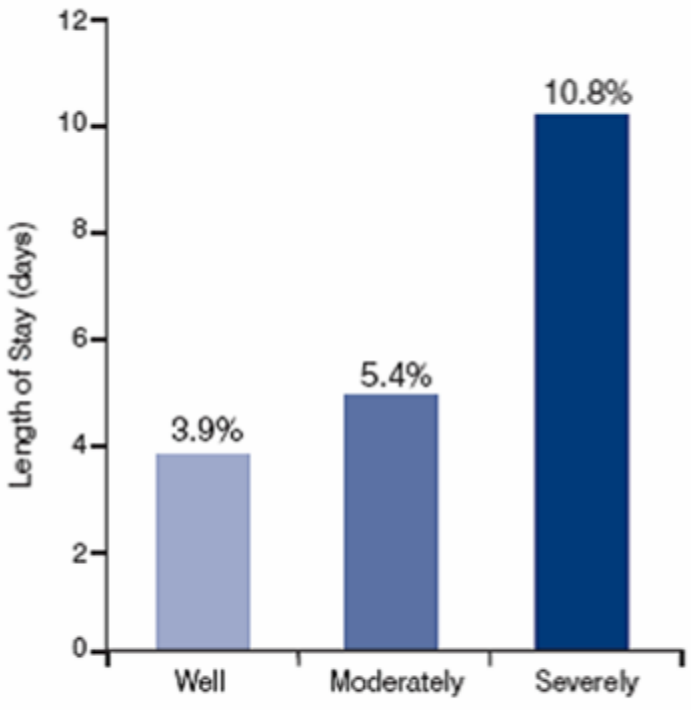
Malnutrition Impacts Outcome

Up to 3 times higher risk of infection[20]



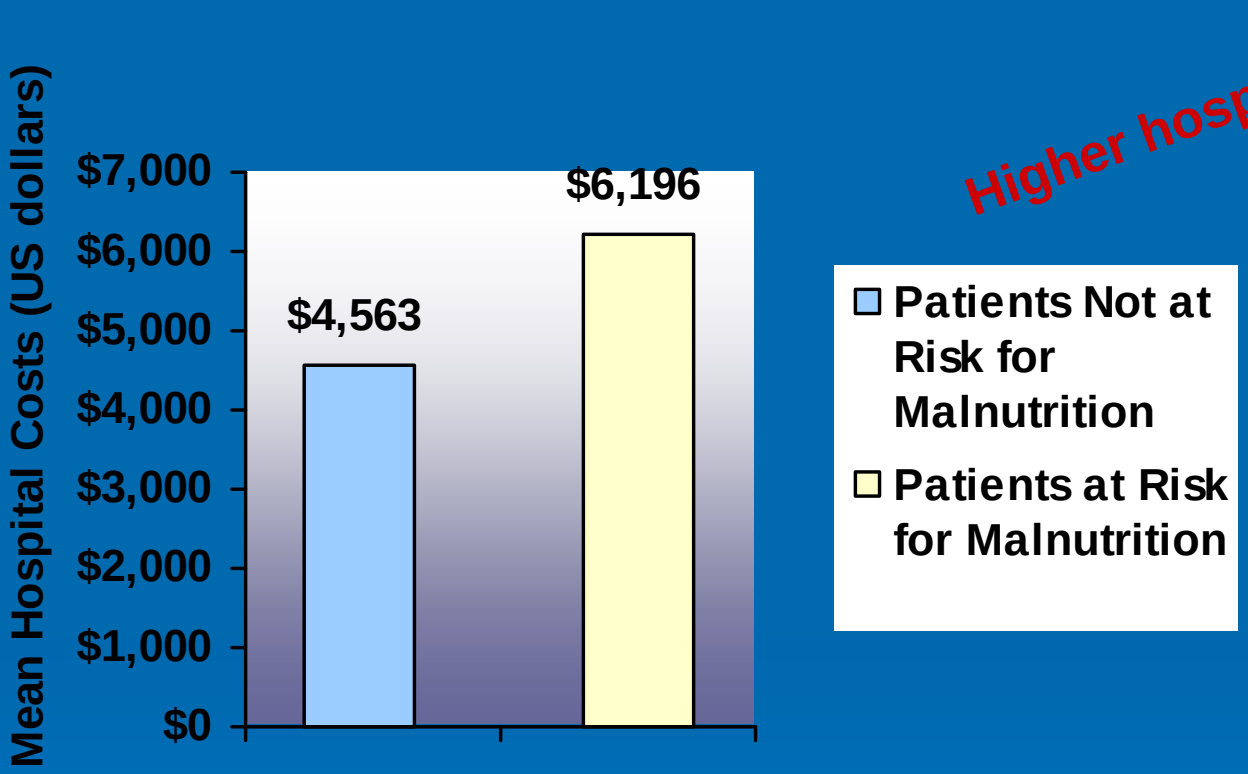
Schneider SM et al BMJ 2004

A longer length of hospital stay[16]



Pichard et al. AJCN 2004

Patients at risk for malnutrition ↑ hospital costs



Source: Chima et al., 1997.

* Includes hospital costs only, such as per diem, laboratory tests, medications, therapies and procedures; excludes physician fees.

$p<0.02$

Nutritional Intervention in the Growing Older Population




"Nutritional intervention holds the promise of mitigating the growing burden of chronic disease and disability and improving the quality of life of the rapidly growing older population. "

Geriatric Nutrition, ed. Morley, Thomas, 2007



Outlines

- Malnutrition in the elderly population
- Nutrition screening and intervention for the elderly population
- Introduction of Mini Nutrition Assessment (MNA®)
- Application of Mini Nutrition Assessment (MNA®) in different settings
- Mini Nutrition Assessment (MNA®) resources