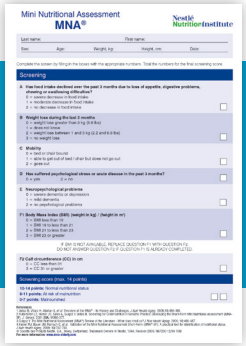
Nutrition Screening

as easy as mna

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


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. 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 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

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

Source: Rubenstein LZ, Harker JO, Salvà A, et al. Screening for Undernutrition in Geriatric Practice: Developing the Short-Form Mini-Nutritional Assessment (MNA-SF). J Gerontol A Biol Sci Med Sci. 2001;56(6):M366-72. doi: 10.1093/gerona/56.6.m366. PMID: 11382797.
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For more information: www.mna-elderly.com

Screen and intervene.
Nutrition can make a difference.

NestléNutritionInstitute

Introduction

Mini Nutritional Assessment – Short Form (MNA®-SF)

The MNA®-SF is a screening tool to help identify elderly patients who are malnourished or at risk of malnutrition. This User Guide will assist you in completing the MNA®-SF accurately and consistently. It explains each question and how to assign and interpret the score.

Introduction

While the prevalence of malnutrition in the free living elderly population is relatively low, the risk of malnutrition increases dramatically in the institutionalized and hospitalized elderly.[1] The prevalence of malnutrition is even higher in cognitively impaired elderly individuals and is associated with cognitive decline.[2]

Patients who are malnourished when admitted to the hospital tend to have longer hospital stays, experience more complications, and have greater risks of morbidity and mortality than those whose nutritional state is normal.[3]

By identifying older persons who are malnourished or at risk of malnutrition either in the hospital or community setting, the MNA®-SF allows clinicians to intervene earlier to provide adequate nutritional support, prevent further deterioration, and improve patient outcomes.[4]

Mini Nutritional Assessment – Short Form (MNA®-SF)

The MNA®-SF provides a simple and quick method of identifying elderly persons who are at risk for malnutrition, or who are already malnourished. It identifies the risk of malnutrition before severe changes in weight or serum protein levels occur.

The MNA®-SF was developed by Nestlé and leading international geriatricians and remains one of the few validated screening tools for the elderly. It has been well validated in international studies in a variety of settings[5-7] and correlates with morbidity and mortality.

In 2009 the MNA®-SF was validated as a stand alone screening tool, based on the full MNA®.[8] The MNA®-SF may be completed at regular intervals in the community and in the hospital or long-term care setting. It is recommended to be done annually in the community, and every 3 months in the hospital or long-term care or whenever a change in clinical condition occurs.

Instructions to complete the MNA®-SF

Before beginning the MNA®-SF, please enter the patient's information on the top of the form:

- *Name • Gender • Age*
- *Weight (kg)* – To obtain an accurate weight, remove shoes and heavy outer clothing. Use a calibrated and reliable set of scales. Pounds (lbs) must be converted to kilograms (1 lb = 0.45 kg).
- *Height (cm)* – Measure height without shoes using a stadiometer (height gauge). If the patient is bedridden, measure height by demispan, half arm-span, or knee height (see Appendix 2). Inches must be converted to centimeters (1 inch = 2.54 cm).
- *Date of screen*

Identify

The Mini Nutritional Assessment Short Form (MNA®-SF) is an effective tool to help identify patients who are malnourished or at risk of malnutrition

✔ Most validated tool for the elderly

- Sensitive and reliable
- Recommended by national and international organisations
- Supported by more than 450 published studies

✔ Quick and easy to use

- Screen in less than 5 minutes
- Requires no special training
- No laboratory data needed

✔ Effective

- Identifies at-risk persons before weight loss occurs

✔ Facilitates early intervention

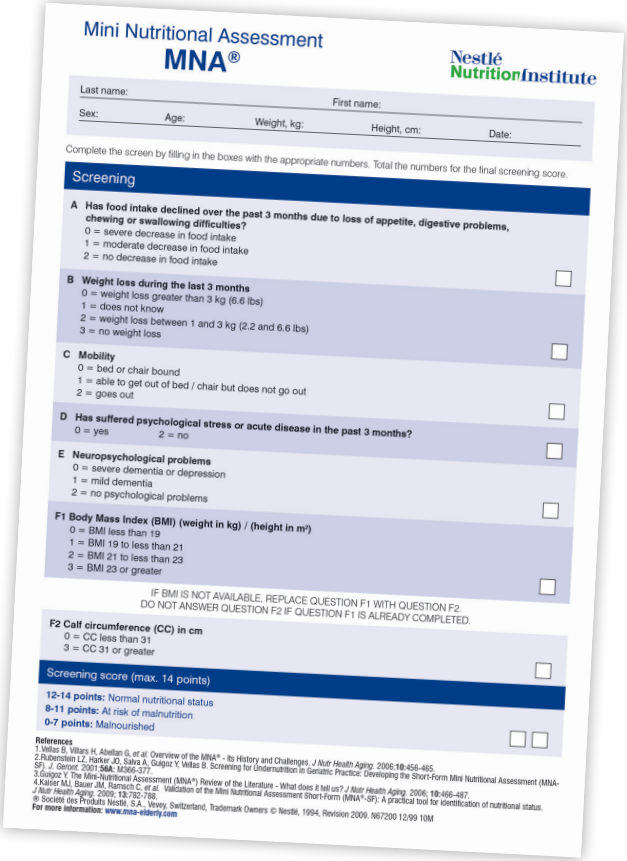
Intervene

Recommend Nestlé Nutrition supplements to help your patients improve their nutritional status

Monitor

✔ Inexpensive diagnostic tool

- The MNA®-SF tool allows standardised, reproducible and reliable determination of nutritional status
- Use the MNA®-SF regularly to assess your patients' nutritional status and provide intervention as required



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. 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 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

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

References
1.Vellas B, Villars H, Abellan G, *et al.* Overview of the MNA® - Its History and Challenges. *J Nutr Health Aging.* 2006;**10**:456-465.
2.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. Gerontol.* 2001;**56A**: M366-372.
3.Guigoz Y. The Mini-Nutritional Assessment (MNA®) Review of the Literature - What does it tell us? *J Nutr Health Aging.* 2006; **10**:466-487.
4.Kaiser MJ, Bauer JM, Ramsch C, *et al.* Validation of the Mini Nutritional Assessment Short-Form (MNA®-SF): A practical tool for identification of nutritional status. *J Nutr Health Aging.* 2009; **13**:782-788.
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For more information: www.mna-elderly.com

Screening (MNA®-SF)

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

Key Points

Ask the patient to answer questions A – F, using the suggestions in the shaded areas. If the patient is unable to answer the question, ask the patient's caregiver to answer or check the medical record.

A

Has food intake declined over the past three months due to loss of appetite, digestive problems, chewing or swallowing difficulties?

Score 0 = Severe decrease in food intake
1 = Moderate decrease in food intake
2 = No decrease in food intake

Ask patient or caregiver or check the medical record

- *"Have you eaten less than normal over the past three months?"*
- If so, *"is this because of lack of appetite, chewing, or swallowing difficulties?"*
- If yes, *"have you eaten much less than before or only a little less?"*

B

Involuntary weight loss during the last 3 months?

Score 0 = Weight loss greater than 3 kg (6.6 pounds)
1 = Does not know
2 = Weight loss between 1 and 3 kg (2.2 and 6.6 pounds)
3 = No weight loss

Ask patient / Review medical record

- *"Have you lost any weight without trying over the last 3 months?"*
- *"Has your waistband gotten looser?"*
- *"How much weight do you think you have lost? More or less than 3 kg (or 6 pounds)?"*

Though weight loss in the overweight elderly may be appropriate, it may also be due to malnutrition. When the weight loss question is removed, the MNA® loses its sensitivity, so it is important to ask about weight loss even in the overweight.

C

Mobility?

Score 0 = Bed or chair bound
1 = Able to get out of bed/chair, but does not go out
2 = Goes out

Ask patient / Review patient's medical record / Ask caregiver

- *"How would you describe your current mobility?"*
  - *"Are you able to get out of a bed, a chair, or a wheelchair without the assistance of another person?"* – if not, would score 0
  - *"Are you able to get out of a bed or a chair, but unable to go out of your home?"* – if yes, would score 1
  - *"Are you able to leave your home?"* – if yes, would score 2

D

Has the patient suffered psychological stress or acute disease in the past three months?

Score 0 = Yes
2 = No

Ask patient / Review patient medical record / Use professional judgment

- *"Have you been stressed recently?"*
- *"Have you been severely ill recently?"*

E

Neuropsychological problems?

Score 0 = Severe dementia or depression
1 = Mild dementia
2 = No psychological problems

Review patient medical record / Use professional judgment / Ask patient, nursing staff or caregiver

- *"Do you have dementia?"*
- *"Have you had prolonged or severe sadness?"*

The patient's caregiver, nursing staff or medical record can provide information about the severity of the patient's neuropsychological problems (dementia).

F1

Body mass index (BMI)?
(weight in kg / height in m^2)

Score 0 = BMI less than 19
1 = BMI 19 to less than 21
2 = BMI 21 to less than 23
3 = BMI 23 or greater

Determining BMI
BMI is used as an indicator of appropriate weight for height (Appendix 1)

BMI Formula – US units
- BMI = (Weight in Pounds / [Height in inches x Height in inches]) x 703

BMI Formula – Metric units
- BMI = (Weight in Kilograms / [Height in Meters x Height in Meters])

1 Pound = 0.45 Kilograms
1 Inch = 2.54 Centimeters

Before determining BMI, record the patient's weight and height on the MNA® form.

1. If height has not been measured, please measure using a stadiometer or height gauge (Refer to Appendix 2).
2. If the patient is unable to stand, measure height using indirect methods such as measuring demi-span, arm span, or knee height. (See Appendix 2).
3. Using the BMI chart provided (Appendix 1), locate the patient's height and weight and determine the BMI.
4. Fill in the appropriate box on the MNA® form to represent the BMI of the patient.
5. To determine BMI for a patient with an amputation, see Appendix 3.

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

F2 Answer only if unable to obtain BMI.

Calf circumference (CC) in cm

0 = CC less than 31

3 = CC 31 or greater

Measuring Calf Circumference

1. The subject should be sitting with the left leg hanging loosely or standing with their weight evenly distributed on both feet.
2. Ask the patient to roll up their trouser leg to uncover the calf.
3. Wrap the tape around the calf at the widest part and note the measurement.
4. Take additional measurements above and below the point to ensure that the first measurement was the largest.
5. An accurate measurement can only be obtained if the tape is at a right angle to the length of the calf.

To measure calf circumference in bed-bound elderly, please refer to Appendix 4

Add the numbers to obtain the screening score.

Screening Score
(Max. 14 points)

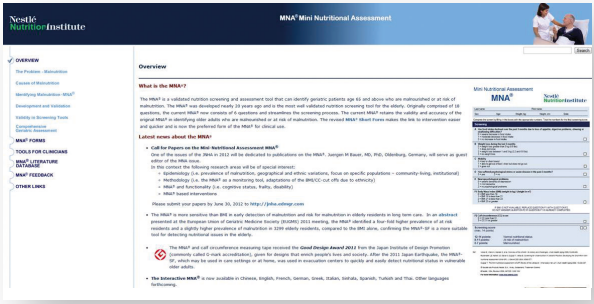
12-14 points: Normal nutritional status

8-11 points: At risk of malnutrition

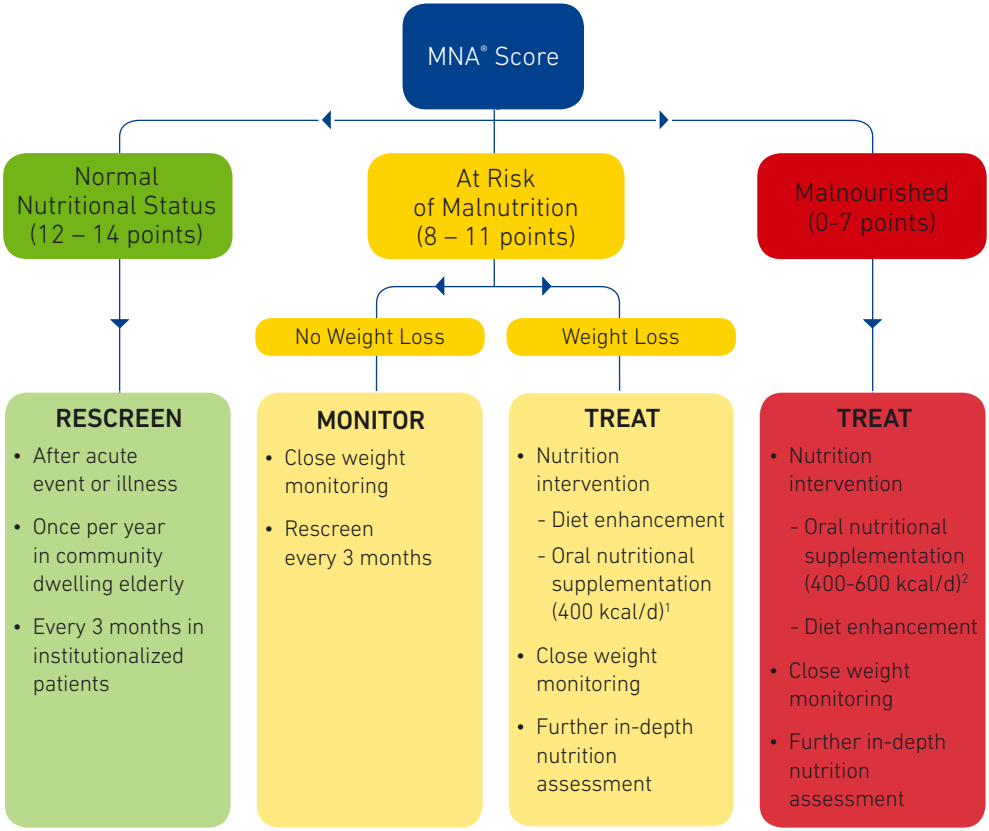
0-7 points: Malnourished

For proposed intervention, please see the algorithm on the next page.

For more information, go to **www.mna-elderly.com**



Recommendations for Intervention



1. Milne AC, *et al. Cochrane Database Syst Rev.* 2009:**2**:CD003288

2. Gariballa S, *et al. Am J Med.* 2006;**119**:693-699

Note: In the elderly, weights and heights are important because they correlate with morbidity and mortality.

Weight and height measurements are often available in the patient record and should be used as a priority. Only when height and/or weight are unavailable, should Calf Circumference (CC) be used instead of BMI.

Important: When the Calf Circumference is used to complete the MNA®-SF, do not use the full MNA®. Otherwise, the full MNA® score will be inaccurate due to the Calf Circumference measurement being counted twice – once in the MNA®-SF and again in Question R of the full MNA®.

Follow-Up

Rescreen all institutionalized elderly patients every three months and normally nourished elderly patients annually in the community.

Please refer results of assessments and re-assessments to dietitian/doctor and record in medical record.

Appendices

Appendix 1 • Body Mass Index table

MNA® BMI Table for the Elderly (age 65 and above)

Height (feet & inches)

Weight (kg)	4'11"	5'0"	5'1"	5'2"	5'3"	5'4"	5'5"	5'6"	5'7"	5'8"	5'9"	5'10"	5'11"	6'0"	6'1"	6'2"	6'3"	Weight (pounds)
45	20	20	19	18	18	17	17	16	16	15	15	14	14	14	13	13	13	100
48	21	21	20	19	19	18	17	17	16	16	16	15	15	14	14	14	13	105
50	22	22	21	20	20	19	18	18	17	17	16	16	15	15	15	14	14	110
52	23	23	22	21	20	20	19	19	18	18	17	17	16	16	15	15	14	115
55	24	23	23	22	21	21	20	19	19	18	18	17	17	16	16	15	15	120
57	25	24	24	23	22	22	21	20	20	19	19	18	17	17	17	16	16	125
59	26	25	25	24	23	22	22	21	20	20	19	19	18	18	17	17	16	130
61	27	26	26	25	24	23	23	22	21	21	20	19	19	18	18	17	17	135
64	28	27	26	26	24	24	23	23	22	21	21	20	19	19	18	18	18	140
66	29	28	27	27	26	25	24	23	23	22	21	21	20	20	19	19	18	145
68	30	29	28	27	27	26	25	24	24	23	22	22	21	20	20	19	19	150
70	31	30	29	28	28	27	26	25	24	24	23	22	22	21	20	20	19	155
73	32	31	30	29	28	28	27	26	25	24	24	23	22	22	21	21	20	160
75	33	32	31	30	29	28	28	27	26	25	24	24	23	22	22	21	21	165
77	34	33	32	31	30	29	28	27	27	26	25	24	24	23	22	22	21	170
80	35	34	33	32	31	30	29	28	27	27	26	25	24	24	23	23	22	175
82	36	35	34	33	32	31	30	29	28	27	27	26	25	24	24	23	23	180
84	37	36	35	34	33	32	31	30	29	28	27	27	26	25	24	24	23	185
86	38	37	36	35	34	33	32	31	30	29	28	27	27	26	25	24	24	190
89	39	38	37	36	35	34	32	32	31	30	29	28	27	26	26	25	24	195
91	40	39	38	37	35	34	33	32	31	31	30	29	28	27	26	26	25	200
93	41	40	39	38	36	35	34	33	32	31	30	29	29	28	27	26	26	205
95	42	41	40	38	37	36	35	34	33	32	31	30	29	29	28	27	26	210
98	43	42	41	39	38	37	36	35	34	33	32	31	30	29	28	28	27	215
100	44	43	42	40	39	38	37	36	35	34	33	32	31	30	29	28	28	220
102	45	44	43	41	40	39	37	36	35	34	33	32	31	31	30	29	28	225
105	47	45	44	42	41	40	38	37	36	35	34	33	32	31	30	30	29	230
107	48	46	44	43	42	40	39	38	37	36	35	34	33	32	31	30	29	234
109	48	47	45	44	43	41	40	39	38	37	35	34	34	33	32	31	30	240
111	49	48	46	45	43	42	41	40	38	37	36	35	34	33	32	32	31	245
114	51	49	48	46	44	43	42	40	39	38	37	36	35	34	33	32	32	250
	150	152.5	155	157.5	160	162.5	165	167.5	170	172.5	175	177.5	180	182.5	185	188	190	

Height (cm)

0 = BMI less than 19

1 = BMI 19 to less than 21

2 = BMI 21 to less than 23

3 = BMI 23 or greater

This abbreviated BMI table is provided for your convenience and facilitates completing the MNA®. It is accurate for the MNA®. In some cases, calculating the BMI may yield a more precise BMI determination.

2.1 • Measuring height using a stadiometer

1. Ensure the floor surface is even and firm.
2. Have subject remove shoes and stand up straight with heels together, and with heels, buttocks and shoulders pressed against the stadiometer.
3. Arms should hang freely with palms facing thighs.
4. Take the measurement with the subject standing tall, looking straight ahead with the head upright and not tilted backwards.
5. Make sure the subject's heels stay flat on the floor.
6. Lower the measure on the stadiometer until it makes contact with the top of the head.
7. Record standing height to the nearest centimeter.

Accessed at:
http://www.ktl.fi/publications/ehrm/product2/part_iii5.htm
Accessed January 15, 2011.

2.2 • Measuring height using demispan

Demispan (half-arm span) is the distance from the midline at the sternal notch to the web between the middle and ring fingers along outstretched arm. Height is then calculated from a standard formula.[9]

1. Locate and mark the midpoint of the sternal notch with the pen.
2. Ask the patient to place the left arm in a horizontal position.
3. Check that the patient's arm is horizontal and in line with shoulders.
4. Using the tape measure, measure distance from mark on the midline at the sternal notch to the web between the middle and ring fingers.
5. Check that arm is flat and wrist is straight.
6. Take reading in cm.

Calculate height from the formula below:

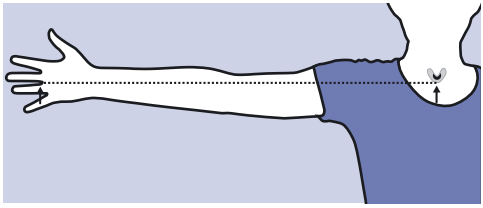
Females

Height in cm =
(1.35 x demispan in cm) + 60.1

Males

Height in cm =
(1.40 x demispan in cm) + 57.8

Demi-span



Source:
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(http://www.bapen.org.uk/pdfs/must/must_explan.pdf)

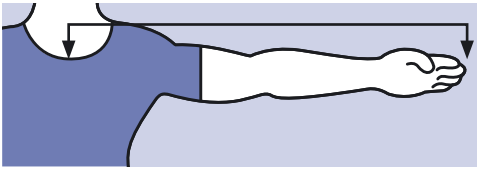
2.3 • Measuring height using half arm-span

Half arm-span is the distance from the midline at the sternal notch to the tip of the middle finger. Height is then calculated by doubling the half arm-span.[10]

1. Locate and mark the edge of the right collar bone (in the sternal notch) with the pen.
2. Ask the patient to place the nondominant arm in a horizontal position.
3. Check that the patient's arm is horizontal and in line with shoulders.
4. Using the tape measure, measure distance from mark on the midline at the sternal notch to the tip of the middle finger.
5. Check that arm is flat and wrist is straight.
6. Take reading in cm.

Calculate height by multiplying the half arm-span measurement by 2

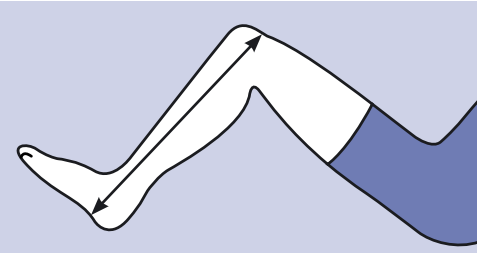
Half arm-span



Source:
http://www.rxkinetics.com/height_estimate.html. Accessed January 15, 2011.

2.4 • Measuring height using knee height

Knee height is one method used to determine statue in the bed- or chair-bound patient and is measured using a sliding knee height caliper. The patient must be able to bend both the knee and the ankle of one leg to 90 degree angles.



Source:
http://www.rxkinetics.com/height_estimate.html. Accessed January 15, 2011.

1. Have the subject bend the knee and ankle of one leg at a 90 degree angle while lying supine or sitting on a table with legs hanging off the table.
2. Place the fixed blade of the knee caliper under the heel of the foot in line with the ankle bone. Place the fixed blade of the caliper on the anterior surface of the thigh about 3.0 cm above the patella.
3. Be sure the shaft of the caliper is in line with and parallel to the long bone in the lower leg (tibia) and is over the ankle bone (lateral malleolus). Apply pressure to compress the tissue. Record the measurement to the nearest 0.1 cm.
4. Take two measurements in immediate succession. They should agree within 0.5 cm. Use the average of these two measurements and the patient's chronological age in the population and gender-specific equations in the table on the right to calculate the subject's stature.
5. The value calculated from the selected equation is an estimate of the person's true stature. The 95 percent confidence for this estimate is plus or minus twice the SEE value for each equation.

Using population-specific formula, calculate height from standard formula:

Population and Gender group	Equation: Stature (cm) =
Non-Hispanic white men (U.S.)[11] [SEE = 3.74 cm]	78.31 + (1.94 x knee height) – (0.14 x age)
Non-Hispanic black men (U.S.)[11] [SEE = 3.80 cm]	79.69 + (1.85 x knee height) – (0.14 x age)
Mexican-American men (U.S.)[11] [SEE = 3.68 cm]	82.77 + (1.83 x knee height) – (0.16 x age)
Non-Hispanic white women (U.S.)[11] [SEE = 3.98 cm]	82.21 + (1.85 x knee height) – (0.21 x age)
Non-Hispanic black women (U.S.)[11] [SEE = 3.82 cm]	89.58 + (1.61 x knee height) – (0.17 x age)
Mexican-American women (U.S.)[11] [SEE = 3.77 cm]	84.25 + (1.82 x knee height) – (0.26 x age)
Taiwanese men[12] [SEE = 3.86 cm]	85.10 + (1.73 x knee height) – (0.11 x age)
Taiwanese women[12] [SEE = 3.79 cm]	91.45 + (1.53 x knee height) – (0.16 x age)
Elderly Italian men[13] [SEE = 4.3 cm]	94.87 + (1.58 x knee height) – (0.23 x age) + 4.8
Elderly Italian women[13] [SEE = 4.3 cm]	94.87 + (1.58 x knee height) – (0.23 x age)
French men[14] [SEE = 3.8 cm]	74.7 + (2.07 x knee height) – (-0.21 x age)
French women[14] [SEE = 3.5 cm]	67.00 + (2.2 x knee height) – (0.25 x age)
Mexican Men[15] [SEE = 3.31 cm]	52.6 + (2.17 x knee height)
Mexican Women[15] [SEE = 2.99 cm]	73.70 + (1.99 x knee height) – (0.23 x age)
Filipino Men[16]	96.50 + (1.38 x knee height) – (0.08 x age)
Filipino Women[16]	89.63 + (1.53 x knee height) – (0.17 x age)
Malaysian men[17] [SEE = 3.51 cm]	(1.924 x knee height) + 69.38
Malaysian women[17] [SEE = 3.40]	(2.225 x knee height) + 50.25

SEE = Standard Error of Estimate[11]

Appendix 3 • Determining BMI for amputees

To determine the BMI for amputees, first determine the patient's estimated weight including the weight of the missing body part.[18,19]

- Use a standard reference (see table) to determine the proportion of body weight contributed by an individual body part.
- Subtract the percentage of body weight contributed by the missing body part(s) from 1.0.
- Then, divide the current weight by the difference of 1 minus the percentage of body weight contributed by the missing body part.

Calculate BMI using estimated height and estimated weight.

Example: 80 year old man, amputation of the left lower leg, 1.72 m, 58 kg

1. **Estimated body weight:** Current body weight ÷ (1 - proportion for the missing leg)

   58 (kg) ÷ [1-0.059] = 58 (kg) ÷ 0.941 = 61.6 kg

2. **Calculate BMI:**
   Estimated body weight / body height $(m)^2$

   61.6 ÷ [1.72 x 1.72] = 20.8

Weight of selected body components

It is necessary to account for the missing body component(s) when estimating IBW.

Table: Percent of Body Weight Contributed by Specific Body Parts

Body Part	Percentage
Trunk w/o limbs	50.0
Hand	0.7
Forearm with hand	2.3
Forearm without hand	1.6
Upper arm	2.7
Entire arm	5.0
Foot	1.5
Lower leg with foot	5.9
Lower leg without foot	4.4
Thigh	10.1
Entire leg	16.0

References cited:

Lefton, J., Malone A. Anthropometric Assessment. In Charney P, Malone A, eds. *ADA Pocket Guide to Nutrition Assessment, 2nd edition*. Chicago, IL: American Dietetic Association; 2009:160-161.

Osterkamp LK., Current perspective on assessment of human body proportions of relevance to amputees, *J Am Diet Assoc.* 1995;**95**:215-218.

Appendix 4 • Measuring calf circumference

1. The subject should be sitting with the left leg hanging loosely or standing with their weight evenly distributed on both feet.
2. Ask the patient to roll up the trouser leg to uncover to calf.
3. Wrap the tape around the calf at the widest part and note the measurement.
4. Take additional measurements above and below the point to ensure that the first measurement was the largest.
5. An accurate measurement can only be obtained if the tape is at a right angle to the length of the calf, and should be recorded to the nearest 0.1 cm.

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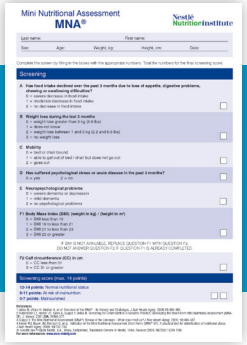
Measuring Calf Circumference in bed-bound persons

1. Have the person being measured lie in supine position with the left knee bent at 90° angle.
2. Slip a loop of the tape measure around the left calf until largest diameter is located.
3. Pull tape so it is just snug but not so tight that tissue is compressed.
4. Read and accurately record measurement to the nearest 0.1 cm. Repeated measurements should agree within 0.5 cm.

References

1. Guigoz Y, Vellas B. Garry PJ. Assessing the nutritional status of the elderly: The Mini Nutritional Assessment as part of the geriatric evaluation. *Nutr Rev* 1996;**54**:S59-S65.
2. Fallon C, Bruce I, Eustace A, *et al.* Nutritional status of community dwelling subjects attending a memory clinic. *J Nutr Health Aging* 2002;**6**(Supp):21.
3. Kagansky N, Berner Y, Koren-Morag N, Perelman L, Knobler H, Levy S. Poor nutritional habits are predictors of poor outcomes in very old hospitalized patients. *Am J Clin Nutr* 2005;**82**:784-791.
4. Vellas B, Villars H, Abellan G *et al.* Overview of the MNA® – It's history and challenges. J Nutr Health Aging 2006;**10**:456-463.
5. Guigoz Y, Vellas J, Garry P (1994). Mini Nutritional Assessment: A practical assessment tool for grading the nutritional state of elderly patients. *Facts Res Gerontol 4* (supp. 2):15-59.
6. Guigoz Y. The Mini-Nutritional Assessment (MNA®) review of the literature – what does it tell us? *J Nutr Health Aging* 2006;**10**:466-485.
7. Murphy MC, Brooks CN, New SA, Lumbers ML. The use of the Mini Nutritional Assessment (MNA) tool in elderly orthopaedic patients. *Eur J Clin Nutr* 2000;**54**:555-562.
8. Kaiser MJ, Bauer JM, Ramsch C, *et al.* Validation of the Mini Nutritional Assessment Short-Form(MNA®-SF): A practical tool for identification of nutritional status. *J Nutr Health Aging.* 2009;**13**: 782-788.
9. HIckson M, Frost G. A comparison of three methods for estimating height in the acutely ill elderly population. *J Hum Nutr Diet* 2003;**6**:1-3.
10. Kwok T, Whjitelaw, MN. The use of armspan in nutritional assessment of the elderly. *J Am Geriatric Soc* 1991;**39**:492-496.
11. Chumlea WC, Guo SS, Wholihan K, Cockram D, Kuczmarski RJ, Johnson CL. Stature prediction equations for elderly non-Hispanic white, non-Hispanic black, and Mexican-American persons developed from NHANES III data. *J Am Diet Assoc* 1998;**98**:137-142.
12. Cheng HS, See LC, Sheih YH. Estimating stature from knee height for adults in Taiwan. *Chang Gung Med J.* 2001;**24**:547-556.
13. Donini LM, de Felice MR, De Bernardini L, *et al.* Prediction of stature in the Italian elderly. *J Nutr Health Aging.* 2000;**4**:72-76.
14. Guo SS, Wu X, Vellas B, Guigoz Y, Chumlea WC. Prediction of stature in the French elderly. *Age & Nutr.* 1994;**5**:169-173.
15. Mendoza-Nunez VM, Sanchez-Rodrigez MA, Cervantes-Sandoval A, et al. Equations for predicting height for elderly Mexican-Americans are not applicable for elderly Mexicans. *Am J Hum Biol* 2002;**14**:351-355.
16. Tanchoco CC, Duante CA, Lopez ES. Arm span and knee height as proxy indicators for height. *J Nutritionist-Dietitians' Assoc Philippines* 2001;**15**:84-90.
17. Shahar S, Pooy NS. Predictive equations for estimation of statue in Malaysian elderly people. *Asia Pac J Clin Nutr.* 2003:**12**(1):80-84.
18. Lefton J, Malone A. Anthropometric Assessment. In Charney P, Malone A, eds. ADA Pocket Guide to Nutrition Assessment. 2nd edtion Chicago, IL: American Dietetic Association; 2009:160-161.
19. Osterkamp LK. Current perspective on assessment of human body proportions of relevance to amputees. *J Am Diet Assoc.* 1995;**95**:215-218.


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. 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 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

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

References
1 Rubenstein LZ, Harker JO, Salvà A, Guigoz Y, Vellas B. Screening for undernutrition in geriatric practice: developing the short-form mini-nutritional assessment (MNA-SF). J Gerontol A Biol Sci Med Sci. 2001;56(6):M366-72.
2 Guigoz Y, Vellas B, Garry PJ. Mini Nutritional Assessment (MNA®): Review of the Literature - What does it tell us? J Nutr Health Aging. 2006; 10:466-487.
3 Vellas B, Guigoz Y, Garry PJ, et al. The Mini Nutritional Assessment (MNA) and its use in grading the nutritional status of elderly patients. Nutrition. 1999;15(2):116-22.
4 Kaiser MJ, Bauer JM, Ramsch C, et al. Validation of the Mini Nutritional Assessment short-form (MNA®-SF): A practical tool for identification of nutritional status. J Nutr Health Aging. 2009;13(9):782-8.
5 Nestlé Nutrition Institute, Switzerland, Nestlé Nutrition Services Vevey, Nestlé Nutrition Services Nestlé, Vevey, Version 2009, 18/1200 / 2244 136

For more information: www.mna-elderly.com

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