

USE THE MID-UPPER ARM CIRCUMFERENCE (MUAC) Z-SCORE TAPE

MONITOR A CHILD'S NUTRITIONAL STATUS



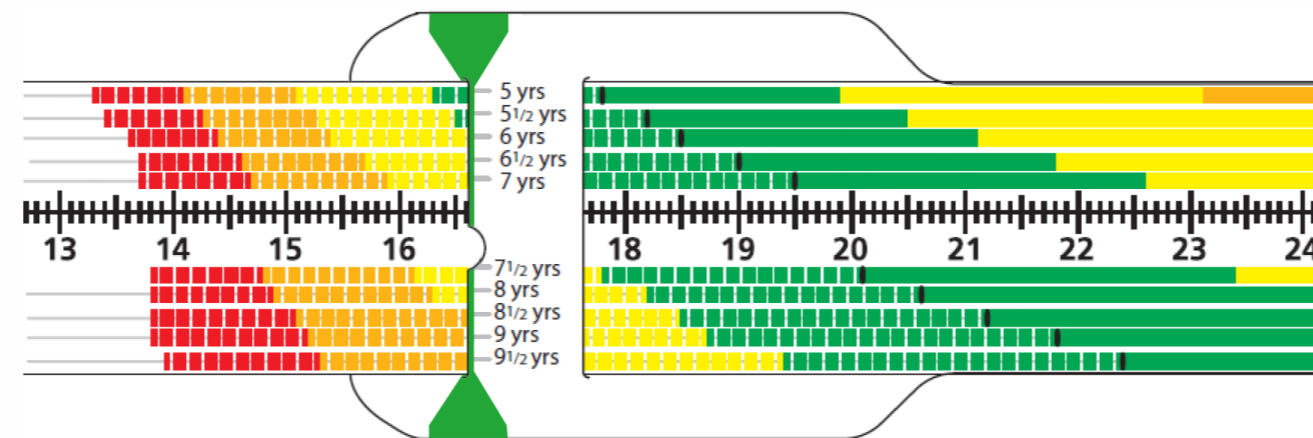
PediaSure[®]

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WHAT IS THE MUAC Z-SCORE TAPE?

A validated paper-based tool which measures the mid-upper arm circumference (MUAC) in patients aged 2 months to 18 years and uses colour coding to identify patients' approximate MUAC z-score range. It is used to identify children who are at nutritional risk in inpatient or outpatient settings.¹⁻³



References: 1. Thaete K, et al. *Glob Pediatr Health*. 2019;6:2333794X19861575. 2. Abdel-Rahman S, et al. *Nutr Clin Pract*. 2017;32(1):68-76. 3. Becker P, et al. *Nutr Clin Pract*. 2015;30(1):147-161.

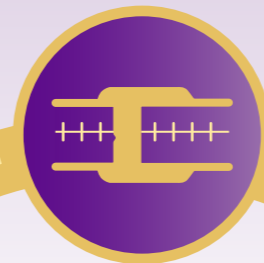
USE THE MID-UPPER ARM CIRCUMFERENCE (MUAC) Z-SCORE TAPE



Why should we use MUAC measurements to monitor a child's nutritional status?



What are z-scores and how do you read them?



Benefits of using the MUAC Z-Score tape



How do you use the MUAC Z-Score tape?





WHY SHOULD WE USE MUAC MEASUREMENTS TO MONITOR A CHILD'S NUTRITIONAL STATUS?

- The mid-upper arm is not affected by water retention or rapid fluid shifts that could otherwise impact weight.
- Closer correlation with lean mass ratio and have been correlated to BMI in children.^{1,2}
- Stronger predictor of mortality than height or weight-based indicators in severe acutely malnourished paediatric patients.³



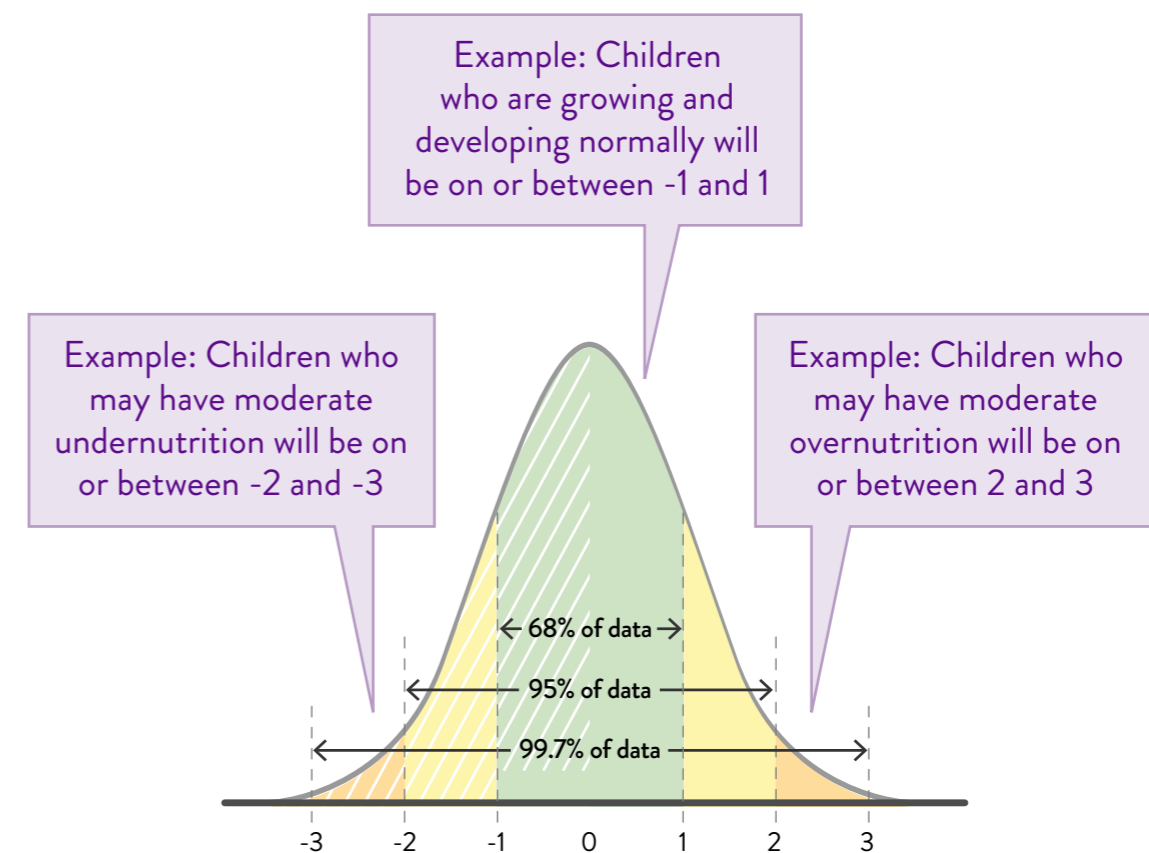
MUAC measurements are sensitive to changes in nutritional status

References: 1. Miller MA, et al. *Arch Public Health*. 2019;77:44. 2. Stephens K, et al. *Nutr Clin Pract*. 2018; 33(1):124–132. 3. Becker P, et al. *J Acad Nutr Diet*. 2014;114:1988–2000.



WHAT ARE Z-SCORES AND HOW DO YOU READ THEM?

- A statistical term referring to the number of standard deviations away from the mean (mean measurement = 0).¹
- One standard deviation above the mean is represented by +1, where one standard deviation below the mean is -1.
- It is preferred over percentile scores for identifying children at the extremes of weight, height, MUAC and BMI.
- For example, a child below the 3rd percentile (and off the growth curve on a percentile chart) may be -2, -3 or even lower on the z-score chart.



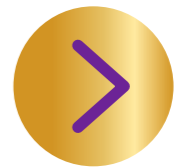
The z-score allows for more accurate identification of nutrition risk and is more sensitive for tracking change over time

Reference: 1. Becker P, et al. *J Acad Nutr Diet.* 2014;114:1988–2000.



BENEFITS OF USING THE MUAC Z-SCORE TAPE

The MUAC Z-Score tape can be used to screen for children at nutritional risk even without a scale and stadiometer.¹



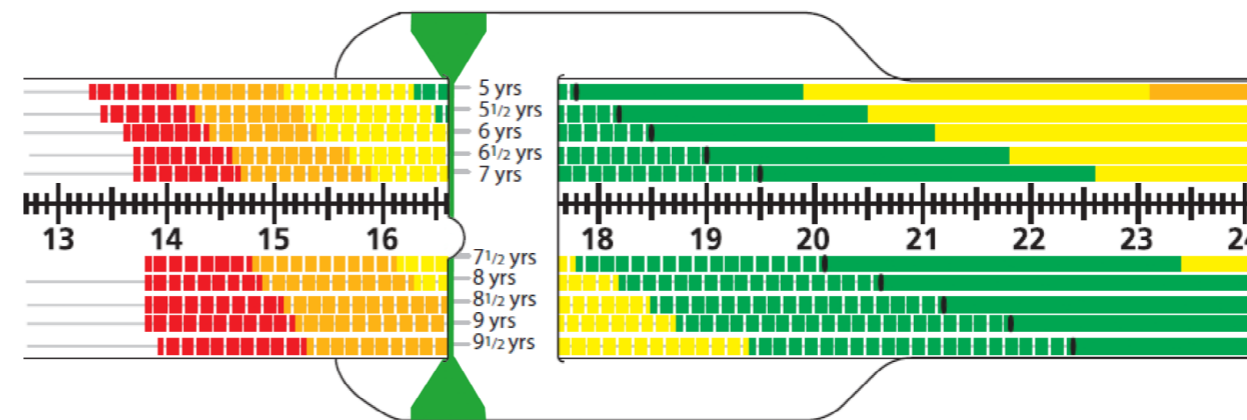
Reference: 1. Miller MA, et al. *Arch Public Health*. 2019;77:44.



BENEFITS OF USING THE MUAC Z-SCORE TAPE

With colour-coded bands that translate the MUAC measurement into the z-score category,¹ the tape gives immediate feedback to the user and can be used to initiate discussions with parents and caregivers about malnutrition risk.

For example, it would be easier for many families to talk about the colour associated with a z-score between -2 and -3, which is orange.



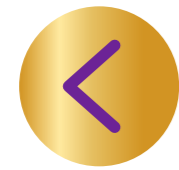
REFERENCE TABLE FOR Z-SCORE RANGES ON TAPE		
Colour/pattern key	MUAC z-score range	Risk classification
■ Solid orange	2 to 3	Moderate overnutrition
■ Solid yellow	1 to 2	Mild overnutrition
■ Solid green	0 to 1	Normal
▨ Hashed green	-1 to 0	Normal
▨ Hashed yellow	-2 to -1	Mild undernutrition
▨ Hashed orange	-3 to -2	Moderate undernutrition
▨ Hashed red	-4 to -3	Severe undernutrition

Reference: 1. Becker P, et al. *J Acad Nutr Diet.* 2014;114:1988–2000.



BENEFITS OF USING THE MUAC Z-SCORE TAPE

The MUAC Z-Score tape is especially useful to screen children for whom height and weight are unreliable measures, for example:



Children who are not able to use scales, such as those with physical disabilities who may not be able to stand on scales.



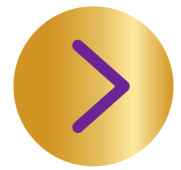
Children who are weight sensitive, such as those with eating disorders.



Children with fluid accumulation, rapid fluid shifts or tumours.



Infants and younger children for whom obtaining an accurate length/height may be more challenging.





BENEFITS OF USING THE MUAC Z-SCORE TAPE

With support from a healthcare professional, the MUAC Z-Score tape can also be used by parents to monitor their child's progress and to support anthropometric data collection during remote consultations.¹



Reference: 1. Blackwell N, et al. *Arch Public Health*. 2015;73:26.

MUAC Z-SCORE TAPE INSTRUCTIONS

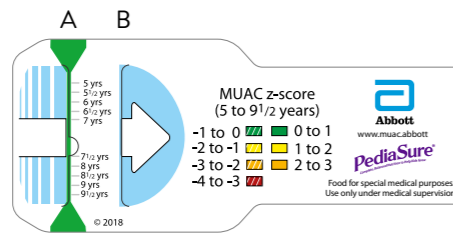


STEP 1

PREPARE YOUR EQUIPMENT AND CREATE A LOOP

Based on your order, you will receive either a 2-sided infant MUAC Z-Score tape or a 2-sided child MUAC Z-Score tape. Locate the end of the tape and insert the end into slit 'A' then through slit 'B'.

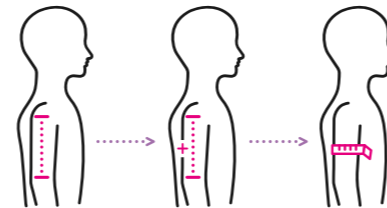
Note: Your MUAC Z-Score tapes are for multi-use. Discontinue use if degradation occurs.



STEP 2

IDENTIFY THE MIDPOINT OF THE UPPER ARM

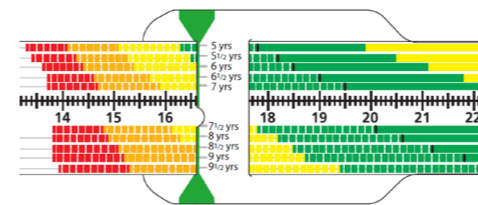
The selected arm should be straight and hanging down at the patient's side with the elbow fully extended before measuring. The midpoint of the arm is located between the acromion and the olecranon process (or between the shoulder cap and elbow). The centimetre markings on the z-score tape can be used as a ruler to assist with finding the midpoint. Once identified, slide the loop you created up to the midpoint of the extended arm. Pull the tail end of the tape until it is snug but does not compress the skin.



STEP 3

RECORD YOUR FINDINGS

Find and record the MUAC measurement in centimetres as found between the two green arrows while using the age of the child to select the proper measurement. Note both the colour and the pattern of the line (solid or hashed).



STEP 4 (OPTIONAL)

UPLOAD TO KIDZGROWTH DATABASE

Scan the QR Code on the MUAC tape to upload the measurements to the KidZGrowth Tracker app. KidZGrowth is a global initiative that generates insights on screening numbers in different countries and regions, with the aim to identify opportunities to support healthcare professionals to screen in an accurate and timely manner. KidZGrowth does not collect any identifying information.



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PRACTISE USING THE Z-SCORE TOOL

In this example, the MUAC is 16.6 cm. The nutritional risk category is determined by using the age of the child to review the proper line. Here are three examples for this measurement.

Age (years)	MUAC z-score range	Risk classification
5	-1 to 0	Normal
7	-2 to -1	Mild undernutrition
9	-3 to -2	Moderate undernutrition

WATCH VIDEO

FOR MORE MUAC RELATED EDUCATION, VISIT WWW.MUAC.ABBOTT
TO ORDER MORE MUAC Z-SCORE TAPES, CONTACT YOUR ABBOTT REPRESENTATIVE