



ACUTE MALNUTRITION IN A CHILD SUFFERING FROM CARIAC PROBLEMS

<http://www.ngds-ku.org/Papers/J40.pdf>



COLOR-CODING KEYS

Syed Arif Kamal[#]

Additional File

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m: meter • cm: centimeter • ft: foot • in: inch • kg: kilogram • lb: pound • oz: ounce
1 m = 100 cm • 1 in = 2.54 cm • 1 ft = 12 in • 1 kg = 2.205 lb • 1 lb = 16 oz

[#]Professor of Mathematics and Dean, Faculty of Science, University of Karachi, Karachi 75270, Pakistan;
homepage: <http://ngds-ku.org/kamal>; e-mail: sakamal@uok.edu.pk

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Formulae used to Generate Growth-and-Obesity Roadmaps I

1. Age was computed by, first converting dates from format *YYYY-MM-DD* into fractional forms, using the following formulae and Table 4 (page 94) of (<http://www.ngds-ku.org/Papers/J29.pdf>) and, then, writing in decimal forms:

$$Date (year) = YYYY + \frac{Days(MM - 1) + DD}{365}; \text{ Age (year)} = Date \text{ of Checkup} - Date \text{ of Birth}$$

Days(MM - 1) represented cumulative days of the previous month. For a leap year, replace 365 by 366.

2. Percentile of height of an adult was calculated by linear interpolation using:

$$P(h) = P(h_{<}) + (P(h_{>}) - P(h_{<})) \left(\frac{h - h_{<}}{h_{>} - h_{<}} \right)$$

where $P(h_{<})$, $P(h)$, $P(h_{>})$ represented percentiles corresponding to heights, $h_{<}$ (20-year height read from extended growth table (http://www.ngds-ku.org/Papers/J34/Additional_File_3.pdf) which was below the measured height), h , $h_{>}$ (20-year height read from growth table, which was above the measured height).

3. Percentile of mass of an adult was calculated with the help of the following formula:

$$P(\mu) = P(\mu_{<}) + (P(\mu_{>}) - P(\mu_{<})) \left(\frac{\mu - \mu_{<}}{\mu_{>} - \mu_{<}} \right)$$

where $P(\mu)$ represented percentile of height and $P(\mu_{<})$ and $P(\mu_{>})$ were the values used for linear interpolation.

4. Estimated-adult height and estimated-adult mass were calculated using the relations:

$$h_{\text{est-adult}} = h_{\text{age-20<}} + (h_{\text{age-20>}} - h_{\text{age-20<}}) \left(\frac{P(h) - P(h_{<})}{P(h_{>}) - P(h_{<})} \right)$$

$$\mu_{\text{est-adult}} = \mu_{\text{age-20<}} + (\mu_{\text{age-20>}} - \mu_{\text{age-20<}}) \left(\frac{P(\mu) - P(\mu_{<})}{P(\mu_{>}) - P(\mu_{<})} \right)$$

Formulae used to Generate Growth-and-Obesity Roadmaps II

5. *BMI* (body-mass index) and estimated-adult *BMI* were computed using (heights in *m* and masses in *kg*):

$$BMI = \frac{\mu}{h^2}; \quad BMI_{\text{est-adult}} = \frac{\mu_{\text{est-adult}}}{(h_{\text{est-adult}})^2}$$

6. Optimal mass of an adult was calculated from the expression:

$$\mu_{\text{opt}} = \mu_{<} + (\mu_{>} - \mu_{<}) \left(\frac{P(h) - P(h_{<})}{P(h_{>}) - P(h_{<})} \right), \quad 20 \text{ years} \leq A < 30 \text{ years}; \quad \mu_{\text{opt}} = 24h^2, \quad A \geq 30 \text{ years} \text{ (height, } h \text{ in } m)$$

where *A* denotes age in years, *P*(*h*) represent percentile of height and *P*(*h*_<) and *P*(*h*_>) were the values used for linear interpolation. For mothers, currently married or recently divorced/widowed, 5 *kg* was added to optimal mass (computed from the above formulae) to account for possible pregnancy and the associated fetal mass.

7. Adult-mid-parental (Target) heights of boy, *h*_{MP-BOY}, and girl, *h*_{MP-GIRL}, were given by:

$$h_{\text{MP-BOY}} = \frac{F + M + 13}{2}; \quad h_{\text{MP-GIRL}} = \frac{F + M - 13}{2}$$

F and *M* represented heights of father and mother, respectively. All heights were in *cm*.

8. Algebraic status, pertaining-to-height, (*h* was height of the individual and *h*_{current-age-MP} was the current-age-mid-parental height) as well as algebraic status, pertaining-to-mass, were computed using the formulae:

$$STATUS_{\pm}(h) = 100 \frac{h - h_{\text{current-age-MP}}}{h_{\text{current-age-MP}}} \%; \quad STATUS_{\pm}(\mu) = 100 \frac{\mu - \mu_{\text{opt}}}{\mu_{\text{opt}}} \%$$

9. To determine percentile of reference height, *P*_{ref}, select the larger value from 3 values consisting of percentile of current height, *P*(*h*), percentile of gender-specific-army-cutoff-height percentile, *P*_{army-cutoff}, as well as percentile of gender-specific-MP-height percentile, *P*_{MP}, where parents' heights were available; otherwise choose larger of *P*(*h*) and *P*_{army-cutoff} :

$$P_{\text{ref}} = \max(P(h), P_{\text{army-cutoff}}, P_{\text{MP}}), \text{ parents' heights available}; \quad P_{\text{ref}} = \max(P(h), P_{\text{army-cutoff}}), \text{ otherwise}$$

Color Coding for Classification of Qualitative Status (pertaining-to-height)

4th-Degree Stunted	Hue Sat Lum	000 255 255 000 128 000	Red Green Blue	$STATUS_{\pm}(h) < -30$
3rd-Degree Stunted	Hue Sat Lum	019 227 233 108 119 010	Red Green Blue	$-30\% \leq STATUS_{\pm}(h) < -20\%$
2nd-Degree Stunted	Hue Sat Lum	032 255 255 192 128 000	Red Green Blue	$-20\% \leq STATUS_{\pm}(h) < -10\%$
1st-Degree Stunted	Hue Sat Lum	042 255 255 255 128 000	Red Green Blue	$-10\% \leq STATUS_{\pm}(h) < -1\%$
Normal	Hue Sat Lum	104 000 255 176 088 080	Red Green Blue	$-1\% \leq STATUS_{\pm}(h) < +1\%$
1st-Degree Tall	Hue Sat Lum	042 255 255 255 128 000	Red Green Blue	$+1\% \leq STATUS_{\pm}(h) < +10\%$
2nd-Degree Tall	Hue Sat Lum	032 255 255 192 128 000	Red Green Blue	$+10\% \leq STATUS_{\pm}(h) < +20\%$
3rd-Degree Tall	Hue Sat Lum	019 227 233 108 119 010	Red Green Blue	$+20\% \leq STATUS_{\pm}(h) < +30\%$
4th-Degree Tall	Hue Sat Lum	000 255 255 000 128 000	Red Green Blue	$STATUS_{\pm}(h) \geq +30\%$

Month-wise recommendations to gain height (cm/month)
 Hue 149 • Sat 255 • Lum 204 • Red 153 • Green 204 • Blue 255

Row separation in Growth-and-Obesity Roadmaps
 Hue 170 • Sat 000 • Lum 230 • Red 230 • Green 230 • Blue 230

Color Coding for Classification of Qualitative Status (pertaining-to-mass)

4th-Degree Wasted	Hue Sat Lum	000 255 255 000 128 000	Red Green Blue	$STATUS_{\pm}(\mu) < -30$
3rd-Degree Wasted	Hue Sat Lum	019 227 233 108 119 010	Red Green Blue	$-30\% \leq STATUS_{\pm}(\mu) < -20\%$
2nd-Degree Wasted	Hue Sat Lum	032 255 255 192 128 000	Red Green Blue	$-20\% \leq STATUS_{\pm}(\mu) < -10\%$
1st-Degree Wasted	Hue Sat Lum	042 255 255 255 128 000	Red Green Blue	$-10\% \leq STATUS_{\pm}(\mu) < -1\%$
Normal	Hue Sat Lum	104 000 255 176 088 080	Red Green Blue	$-1\% \leq STATUS_{\pm}(\mu) < +1\%$
1st-Degree Obese	Hue Sat Lum	104 000 255 176 088 080	Red Green Blue	$+1\% \leq STATUS_{\pm}(\mu) < +10\%$
2nd-Degree Obese	Hue Sat Lum	032 255 255 192 128 000	Red Green Blue	$+10\% \leq STATUS_{\pm}(\mu) < +20\%$
3rd-Degree Obese	Hue Sat Lum	019 227 233 108 119 010	Red Green Blue	$+20\% \leq STATUS_{\pm}(\mu) < +30\%$
4th-Degree Obese	Hue Sat Lum	000 255 255 000 128 000	Red Green Blue	$STATUS_{\pm}(\mu) \geq +30\%$

Month-wise recommendations to gain mass (kg/month)
 Hue 149 • Sat 255 • Lum 204 • Red 153 • Green 204 • Blue 255

Color Coding for Classification of Build

$0 \leq P(h) + P(\mu) < 50$	Hue Sat Lum	000 255 255 000 128 000	Red Green Blue	Small
$50 \leq P(h) + P(\mu) < 150$	Hue Sat Lum	104 000 255 176 088 080	Red Green Blue	Medium
$150 \leq P(h) + P(\mu) < 200$	Hue Sat Lum	042 255 255 255 128 000	Red Green Blue	Big



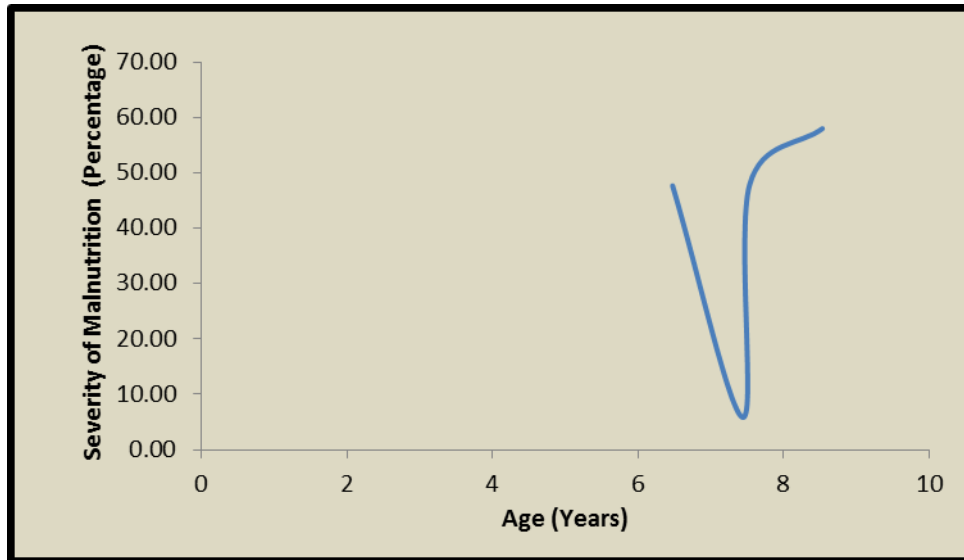
From left to right, an example of children of different builds — brain-function-dominating small (EP: SGPP-KHI-20081031-01/02; age 7 year 11 month; sum of percentiles 8.08), brain-and-body-function-equally-contributing medium (RZAQ: SGPP-KHI-20080423-01/02; age 4 year 3 month 9 day; sum of percentiles 54.29) and body-function-dominating big (RZA: SGPP-KHI-20080910-01/02; age 3 year 4 month 11 day; sum of percentiles 8.08)

Color Coding for Nutritional-Status Classification

		Tall		Energy-Channelization (EC III) Hue 000 128 Red Sat 255 000 Green Lum 064 000 Blue 
	Energy-Channelization (EC I) Hue 170 000 Red Sat 255 000 Green Lum 064 128 Blue 	Over-Nutrition (ON) Hue 085 000 Red Sat 255 051 Green Lum 026 000 Blue 		
Wasted		Under-Nutrition (UN) Hue 170 051 Red Sat 000 051 Green Lum 051 051 Blue 	Energy-Channelization (EC II) Hue 213 128 Red Sat 255 000 Green Lum 064 128 Blue 	Obese
Acute Malnutrition (AM) Hue 000 212 Red Sat 255 000 Green Lum 106 000 Blue 				
		Stunted		

Worked examples: http://www.ngds-ku.org/Presentations/Sport_Mathematics/Additional_File.pdf

Severity of Acute Malnutrition



GR had a drop in the severity of acute malnutrition at the second checkup.
However, the index increased from third to fourth checkup.

Auscultation of Heart and Anthropometry



From left to right, auscultation of heart sounds at *PMI*, pulmonary and tricuspid valves as well as measurements of height and mass of a girl

Web address of the main document:

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