



**AMETHOD TO GENERATE GROWTH-AND-OBESITY PROFILES
OF CHILDREN OF STILL-GROWING PARENTS:
CALCULATIONS OF H. FAMILY**

SGPP-KHI-20080104-01 (simulated)

Syed Arif Kamal and Samira Sahar Jamil



Additional File 1

Table 1. Parents' fractional ages, heights and weights

	<i>Father (A < 21 year)</i>	<i>Mother (A < 19 year)</i>
Date of Birth (year-month-day)	1990-07-04	1992-12-30
Date of Birth (decimal years)	1990.5068493151	1992.99726775956
Date of Checkup (year-month-day)	2009-02-05	2009-02-05
Date of Checkup (decimal years)	2009.09863013698	2009.09863013698
Age (year-month-day)	18-07-01	16-01-05
Age, A (decimal years)	18.59178082188	16.10136237742
Height, h (cm)	170.1	157.0
Height (ft-in) [§]	5 ft 6.968503937 in	5 ft 1.811023622 in
Gross Mass (kg)	59.9	54.1
Dress Code [¶]	2/2 [#]	3/3 [#]
Clothing Correction (kg)	0.5	1.0
Net Mass, μ (kg)	59.4	53.1
Net Weight, W (lb-oz) = 2.205 μ [§]	130 lb 15.632 oz	117 lb 1.368 oz
Body-Mass Index, BMI (kg/m ²)	20.5294737922	21.9481520545

[§] h (in) = $\frac{h \text{ (cm)}}{2.54}$; 1 ft = 12 in; ft stands for feet and in for inch(es); 1 kg = 2.205 lb; 1 lb = 16 oz

[¶]For explanation of dress code (undressing), see *Manual for Obtaining Anthropometric Measurements*, available at: http://www.ngds-ku.org/ngds_folder/M02.pdf

[#]2/2: Full-sleeved shirt, trousers; 3/3: Abaya (an outer garment worn by Muslim women)

Table 2. Height percentile (father)²

$$h = 170.1 \text{ cm}$$

<i>Percentile</i>			
<i>Age (years)</i>	10	25	
$A_{<} = 18.5$	167.50	171.50	
$A = 18.59178082188$	167.50	170.1	171.59178082188
$A_{>} = 19.0$	167.50	172.00	

$$P(h) = 19.531302310098$$

Table 3. Mass percentile (father)²

$$\mu = 59.4 \text{ kg}$$

<i>Percentile</i>			
<i>Age (years)</i>	10	25	
$A_{<} = 18.5$	56.50	61.50	
$A = 18.59178082188$	56.50	59.4	61.68356164376
$A_{>} = 19.0$	56.50	62.50	

$$P(\mu) = 18.3919133193613$$

²Growth parameters (height, mass, percentiles) have been taken from Growth Tables generated from Growth Charts. These tables appear in the main document, available at: <http://www.ngds-ku.org/Papers/J30.pdf>

Table 4. Optimal mass and estimated-adult height (father)

<i>Height Percentile</i>	10	19.5313023100	25
$\mu_{opt<}(kg)$ [$A_{<} = 18.5$ years]	56.50	59.6771007700	61.50
$\mu_{opt}(kg)$ [$A = 18.59178082188$ years]	56.50	59.7937395379 59.7937395379	61.6835616438 [¥]
$W_{opt}(lb-oz)$	131 lb 13.523130896 oz		
$\mu_{opt>}(kg)$ [$A_{>} = 19.0$ years]	56.50	60.3125209240	62.50
$h_{est-adult}(cm)$	167.5	170.359390693	172.0
$h_{est-adult}(ft-in)$	5 ft 7.070626257 in		
$\Delta\mu(kg) = \mu - \mu_{opt}$	-0.39373953799		
$\Delta W(lb-oz) = 2.205\Delta\mu$	-13.8911308005 oz		
$100 \frac{ \Delta\mu }{\mu_{opt}} \%^{\textcircled{c}}$	0.65849625894%		
$STATUS(\mu)^{\textcircled{c}}$	(-)		

COLOR CODES FOR STATUSES		<1%	Hue 085, Sat 255, Lum 064	Red 000, Green 128, Blue 000
		1-10%	Hue 042, Sat 255, Lum 128	Red 255, Green 255, Blue 000
		>10%	Hue 000, Sat 255, Lum 092	Red 184, Green 000, Blue 000

[¥]The entries in blue font show alternate method of constant-age route, which could, also, be used to compute μ_{opt} as 59.7937395379 kg, with identical result 59.7937395379 kg as obtained from constant-percentile route (maroon font).

[©]Status (pertaining-to-mass)

$$STATUS(\mu) = 100 \frac{|\mu - \mu_{opt}|}{\mu_{opt}} = 100 \frac{|\Delta\mu|}{\mu_{opt}} = 100 \frac{|W - W_{opt}|}{W_{opt}}$$

Table 5. Estimated-adult mass/weight and *BMI* (father)

<i>Mass Percentile</i>	10	18.3919133193613	25
$\mu_{\text{est-adult}} \text{ (kg)}$	58.25	61.04730443975	63.25
$W_{\text{est-adult}} \text{ (lb-oz)} = 2.205 \mu_{\text{est-adult}}$		134 lb 9.748900624 oz	
$BMI_{\text{est-adult}} \text{ (kg/m}^2\text{)}$		21.0345141933	

Table 6. Height percentile (mother)[⌘]

$h = 157.0 \text{ cm}$

<i>Percentile</i>	10		25
<i>Age (years)</i>			
$A_{<} = 16.0$	154.50		158.00
$A = 16.10136237742$	154.55068118871	157.0	158.10136237742
$A_{>} = 16.5$	154.75		158.50

$P(h) = 20.347248940899$

Table 7. Mass percentile (mother)[⌘]

$\mu = 53.1 \text{ kg}$

<i>Percentile</i>	25		50
<i>Age (years)</i>			
$A_{<} = 16.0$	48.75		54.00
$A = 16.10136237742$	48.80068118871	53.1	54.10136237742
$A_{>} = 16.5$	49.00		54.50

$P(\mu) = 45.2771995627995$

[⌘]See relevant note on page 2

Table 8. Optimal mass and estimated-adult height (mother)

<i>Height Percentile</i>	10	20.347248940899	25
$\mu_{opt<}(kg)$ [$A_{<} = 16.0$ years]	45.00	47.5868122352	48.75
$\mu_{opt}(kg)$ [$A = 16.10136237742$ years]	45.15204356613	47.6689343511 47.6689343511	48.80068118871 [¥]
$W_{opt}(lb-oz)$		105 lb 1.760196288 oz	
$\mu_{opt>}(kg)$ [$A_{>} = 16.5$ years]	45.75	47.9919039372	49.00
$h_{est-adult}(cm)$	154.75	157.68172053325	159.0
$h_{est-adult}(ft-in)$		5 ft 2.0794175326 in	
$\Delta\mu(kg)^* = \mu - \mu_{opt}$		+5.4310656488	
$\Delta W(lb-oz)^* = 2.205\Delta\mu$		+11 lb 15.6079960898 oz	
$100 \frac{ \Delta\mu }{\mu_{opt}} \%^{\textcircled{c}}$		11.3933019958%	
STATUS (μ)[ⓐ]		OBESSE	

Table 9. Estimated-adult mass/weight and BMI (mother)

<i>Mass Percentile</i>	25	45.2771995627995	50
$\mu_{est-adult}(kg)$	52.25	57.11652789506	58.25
$W_{est-adult}(lb-oz) =$ $2.205\mu_{est-adult}$		125 lb 15.071104128 oz	
$BMI_{estimated-adult}(kg/m^2)$		22.9720153991	

[¥] See relevant note on page 3

[ⓐ] See relevant note on page 3

*Valid if the mother is **NOT PREGNANT**. In case of pregnancy, add estimated weight of fetus and re-determine difference of mass (weight)-for-height and status.

Table 10. Adult-mid-parental (Target) heights and percentiles

<i>Adult-MP-Height Formula</i>	<i>Boy = $\frac{M + F + 13}{2}$</i>	<i>Girl = $\frac{M + F - 13}{2}$</i>
$h_{\text{adult-MP} <} (cm)$	167.5	154.75
$h_{\text{adult-MP}} (cm)$	170.52055561312	157.52055561312
$h_{\text{adult-MP}} (ft-in)$	5 ft 7.13407701303 in	5 ft 2.0159677681 in
$h_{\text{adult-MP} >} (cm)$	172.00	159.00
$P_{\text{MP} <}$	10	10
P_{MP}	20.0685187103	19.7784315757
$P_{\text{MP} >}$	25	25

Table 11. Ages, heights and weights (children)

	<i>Z. H.</i>	<i>T. H.</i>
Gender	Male	Female
Date of Birth (<i>year-month-day</i>)	2005-11-15	2005-11-15
Date of Birth (<i>decimal years</i>)	2005.87397260273	2005.87397260273
Date of Checkup (<i>year-month-day</i>)	2009-02-05	2009-02-05
Date of Checkup (<i>decimal years</i>)	2009.09863013698	2009.09863013698
Age (<i>year-month-day</i>)	03-02-20	03-02-20
Age, <i>A</i> (<i>decimal years</i>)	3.22465753425	3.22465753425
Height, <i>h</i> (<i>cm</i>)	98.1	95.2
Height (<i>ft-in</i>)	3 ft 2.622047244 in	3 ft 1.4803149606 in
Gross Mass (<i>kg</i>)	12.7	15.8
Dress Code (Undressing) [¶]	1.5/1.5 (0/0.5) [§]	1.5/1.5 (0/0.5) [®]
Clothing Correction (<i>kg</i>)	0	0
Net Mass, μ (<i>kg</i>)	12.7	15.8
Net Weight, W (<i>lb-oz</i>) = 2.205μ [§]	28 lb 0.056 oz	34 lb 13.424 oz
Body-Mass Index, <i>BMI</i> (<i>kg/m²</i>)	13.1967110055	17.4334439658

[¶]See relevant note on page 1

[§]T-shirt, shorts (*Undressing*: to briefs only, barefoot, all clothing above the waist removed; *Clothing Correction* was taken as zero as the child was weighed in near-nude state)

[®]T-shirt, miniskirt (*Undressing*: to panties only, barefoot, all clothing above the waist removed; *Clothing Correction* as described above)

[§]See relevant note on page 1



Table 12. Height percentiles (Z. H.: Male)

$h = 98.1 \text{ cm}$

<i>Percentile</i>	50	75	
<i>Age (years)</i>			
$A_{<} = 3.0$	95.00	97.50	
$A = 3.22465753425$	96.57260273975	98.1	99.297260274
$A_{>} = 3.5$	98.50	101.50	

$P(h) = 64.0145801907$

Table 13. Mass percentile (Z. H.: Male)

$\mu = 12.7 \text{ kg}$

<i>Percentile</i>	5	10	
<i>Age (years)</i>			
$A_{<} = 3.0$	12.00	12.50	
$A = 3.22465753425$	12.22465753425	12.7	12.7246573425
$A_{>} = 3.5$	12.50	13.00	

$P(\mu) = 9.7534246575$

Table 14. Optimal mass and estimated-adult height (Z. H.: Male)

<i>Height Percentile</i>	50	64.0145801910	75
$\mu_{\text{opt}<}$ (kg) [$A_{<} = 3.0$ years]	14.50	15.0605832076	15.50
μ_{opt} (kg) [$A = 3.22465753425$ years]	14.9493150685	15.50989827612 15.50989827612	15.9493150685 [¥]
W_{opt} (lb-oz)		34 lb 3.1892111808 oz	
$\mu_{\text{opt}>}$ (kg) [$A_{>} = 3.5$ years]	15.50	16.0605832076	16.50
$h_{\text{est-adult}}$ (cm)	176.5	179.58320764203	182.0
$h_{\text{est-adult}}$ (ft-in)		5 ft 10.7020502527 in	
$\Delta\mu$ (kg) = $\mu - \mu_{\text{opt}}$		-2.80989827614	
ΔW (lb-oz) = $2.205\Delta\mu$		-6 lb 3.13321118 oz	
$100 \frac{ \Delta\mu }{\mu_{\text{opt}}} \%^{\text{©}}$		18.1168066102%	
<i>STATUS</i> (μ) [©]		WASTED	

Table 15. Estimated-adult mass/weight (Z. H.: Male)

<i>Mass Percentile</i>	5	9.7534246575	10
$\mu_{\text{est-adult}}$ (kg)	56.0	58.13904109587	58.25
$W_{\text{est-adult}}$ (lb-oz) = $2.205\mu_{\text{est-adult}}$		128 lb 3.145369856 oz	
$BMI_{\text{est-adult}}$ (kg/m ²)		18.0275378299	

[¥]The entries in blue font show alternate method of constant-age route, which could, also, be used to compute μ_{opt} as 25.10920623004 kg, with identical result 25.10920623004 kg as obtained from constant-percentile route (maroon font).

[©]See relevant note on page 3

Table 16. Computations of mid-parental height at current age (Z. H.: Male)

<i>MP-Height Percentile</i>	10	20.0685187103	25
$h_{CA-MP<} (cm) [A_{<} = 9.0 \text{ years}]$	90.00	91.6780864517	92.50
$h_{CA-MP} (cm) [A = 9.1698630137 \text{ years}]$		93.09989128565	
$h_{CA-MP>} (cm) [A_{>} = 9.5 \text{ years}]$	93.50	94.84246916136	95.50
$\Delta h (cm) = h - h_{CA-MP}$		+5.00010871435	
$\Delta h (in) = \frac{\Delta h (cm)}{2.54}$		+1.96854673793	
$100 \frac{ \Delta h }{h_{CA-MP}} \% ^3$		5.37069232337%	
<i>STATUS (h)³</i>		TALL	

[¥]See relevant note on page 6

³Status (pertaining-to-height)

$$STATUS(h) = 100 \frac{|h - h_{CA-MP}|}{h_{CA-MP}} = 100 \frac{|\Delta h|}{h_{CA-MP}}$$



Table 17. Height percentile (T. H.: Female)

$$h = 95.2 \text{ cm}$$

<i>Percentile</i>	25	50	
<i>Age (years)</i>			
$A_{<} = 3.0$	91.50	93.50	
$A = 3.22465753425$	92.8479452055	95.2	95.297260274
$A_{>} = 3.5$	94.50	97.50	

$$P(h) = 49.007270693$$

Table 18. Mass percentile (T. H.: Female)

$$\mu = 15.8 \text{ kg}$$

<i>Percentile</i>	75	90	
<i>Age (years)</i>			
$A_{<} = 3.0$	15.00	16.50	
$A = 3.22465753425$	15.4493150685	15.8	16.7246573425
$A_{>} = 3.5$	16.00	17.00	

$$P(\mu) = 79.12459782735$$

Table 19. Optimal mass and estimated-adult height (T. H.: Female)

<i>Height Percentile</i>	25	49.007270693	50
$\mu_{opt<}(kg)$ [$A_{<} = 3.0$ years]	13.00	13.9602908277	14.00
$\mu_{opt}(kg)$ [$A = 3.22465753425$ years]	13.22465753425 [¥]	14.1849483620 14.1849483620 [¥]	14.22465753425 [¥]
$W_{opt}(lb-oz)$		31 lb 4.4449782064 oz	
$\mu_{opt>}(kg)$ [$A_{>} = 3.5$ years]	13.50	14.4602908277	14.50
$h_{est-adult}(cm)$	159.0	163.32130872483	163.5
$h_{est-adult}(ft-in)$		5 ft 4.2997278444 in	
$\Delta\mu(kg) = \mu - \mu_{opt}$		+1.6150516380	
$\Delta W(lb-oz) = 2.205\Delta\mu$		+3 lb 8.9790217890 oz	
$100 \frac{ \Delta\mu }{\mu_{opt}} \%^{\textcircled{c}}$		11.3856716063%	
STATUS (μ)[ⓐ]		OBESE	

Table 20. Estimated-adult mass/weight (T. H.: Female)

<i>Mass Percentile</i>	75	79.12459782735	90
$\mu_{est-adult}(kg)$	66.00	68.54350199353	75.25
$W_{est-adult}(lb-oz) =$ $2.205\mu_{est-adult}$		151 lb 2.21475032 oz	
$BMI_{estimated-adult}(kg/m^2)$		25.6968917247	

[¥]See relevant note on page 3

[ⓐ]See relevant note on page 3

Table 21. Mid-parental height at current age (T. H.: Female)

<i>MP-Height Percentile</i>	10	19.7784315757	25
$h_{CA-MP<} (cm) [A_{<} = 3.0 \text{ years}]$	87.50	90.10758175352	91.50
$h_{MP-CA} (cm)$ $[A = 3.22465753425 \text{ years}]$		91.76834420891	
$h_{CA-MP>} (cm) [A_{>} = 3.5 \text{ years}]$	92.50	93.80379087676	94.50
$\Delta h (cm) = h - h_{CA-MP}$		+3.43165579109	
$\Delta h (in) = \frac{\Delta h (cm)}{2.54}$		+1.35104558704	
$100 \frac{ \Delta h }{h_{CA-MP}} \%^3$		3.73947663616%	
<i>STATUS (h)³</i>		TALL	

³See relevant note on page 11

Web address of the main document:

A METHOD TO GENERATE GROWTH-AND-OBESITY PROFILES OF CHILDREN OF STILL-GROWING PARENTS

<http://www.ngds-ku.org/Papers/J30.pdf>

Web address of this document:

Additional File 1: GROWTH-AND-OBESITY CALCULATIONS OF H. FAMILY

http://www.ngds-ku.org/Papers/J30/Additional_File_1.pdf