UNIVERSITY OF KWA ZULU NATAL, SAEES, DISCIPLINE OF DIETETICS AND HUMAN NUTRITION, EXAMINATION NOV/DEC 2015, DIET 360 DIET THERAPY SURGICAL

FORMULA HANDOUT

APPENDIX B2 TRICEPS SKINFOLD THICKNESS: YOUTH, 1-17 YEARS, UNITED STATES: 1971 - 1974

race and age in years	Number in sample	Estimated Population in thousands	Mean	Standard Deviation	Percentile 5th	10th	15th	25th	50th	75th	85th	90th	95th
					MALES	Triceps skinfolds in Millimeters							
WHITE													
1	211	1.402	10.7	3.0	7.0	7.0	7.5	8.0	10.0	12.0	14.0	15.0	16.5
2	217	1.461	9.9	2.6	6.0	6.5	7.0	8.0	10.0	12.0	12.5	13.0	14.7
3	226	4.536	9.9	2.6	6.5	7.0	7.0	8.0	10.0	11.0	12.5	13.5	14.5
4	229	1.547	9.6	2.4	6.0	7.0	7.0	8.0	10.0	11.0	12.0	12.5	14.0
5	207	1.319	9.8	3.2	6.0	6.5	7.0	7.5	9.0	11.0	12.5	13.5	15.0
6	126	1.343	8.9	3.1	5.5	5.6	6.0	7.0	9.0	10.0	12.0	12.5	14.0
7	125	1.718	9.1	3.5	5.0	6.0	6.0	7.0	8.0	10.5	12.0	13.5	17.0
8	116	1.644	9.1	3.3	5.0	5.5	6.0	7.0	8.5	10.5	12.0	13.0	16.0
9	117	1.636	11.1	4.8	5.5	6.5	6.5	7.5	10.0	14.0	17.0	17.0	19.0
10	148	1.909	11.1	4.2	5.5	6.0	7.0	8.0	10.0	14.0	15.5	17.0	19.5
11	132	1.823	12.5	6.5	6.0	6.0	7.0	8.0	10.0	15.0	19.0	20.5	24.5
12	152	1.970	12.4	6.1	6.0	6.0	7.0	8.5	11.0	14.0	18.0	21.0	27.0
13	129	1.697	11.7	6.7	5.0	5.0	6.0	7.0	10.0	14.0	19.0	22.0	25.5
14	134	1.730	10.9	6.4	4.0	5.0	6.0	7.0	9.0	13.0	18.0	20.0	24.0
15	124	1.728	10.2	6.1	4.0	5.0	6.0	6.0	8.0	12.0	15.0	19.0	24.0
16	128	1.752	10.1	5.2	4.0	5.0	5.0	6.5	9.0	12.5	15.0	17.0	22.0
17	139	1.831	9.3	5.4	4.5	5.0	5.5	6.0	7.5	11.0	13.0	15.0	19.0
BLACK													
1	72	280	9.4	3.4	4.5	6.0	7.0	8.0	8.0	11.0	12.0	13.0	15.0
2	77	267	10.1	3.2	4.5	6.0	6.5	8.0	10.0	12.0	14.0	15.0	15.0
3	72	212	9.1	2.6	6.0	6.5	6.5	7.0	9.0	10.5	12.0	12.0	13.0
4	74	260	8.0	2.6	5.0	5.0	5.0	6.5	7.0	9.0	10.0	10.5	15.0
5	64	226	7.7	3.4	4.5	5.0	5.0	5.0	7.0	9.0	10.0	12.0	15.5
6	52	321	7.1	1.8	4.0	4.0	5.0	6.0	7.0	8.0	9.0	9.0	9.0
7	38	253	7.5	3.2	4.0	4.0	4.0	5.0	6.5	9.0	11.5	13.0	15.0
8	33	203	7.8	3.4	4.0	5.0	5.0	6.0	6.5	10.0	11.0	11.0	12.5
9	52	383	8.2	3.9	3.5	4.0	4.5	6.0	7.0	8.0	12.0	13.0	18.0
10	33	251	9.1	5.3	5.0	5.0	6.0	6.0	7.5	10.0	13.0	15.0	20.0
11	43	313	8.0	5.0	4.0	4.0	5.0	5.0	6.0	8.5	11.0	12.0	15.0
12	47	316	9.4	7.0	4.0	4.0	4.5	6.0	7.5	10.7	11.0	15.0	24.0
13	45	281	8.2	4.4	4.0	5.0	5.0	5.0	7.0	8.5	11.0	19.0	19.0
14	39	282	6.6	2.6	3.5	3.5	3.5	5.0	6.5	7.0	8.0	9.0	12.0
15	43	310	8.9	6.1	4.0	4.5	5.0	5.0	6.5	9.0	10.0	21.0	21.0
16	41	267	7.2	4.8	4.0	4.0	4.0	5.0	6.0	7.5	8.0	11.0	15.0
17	35	235	8.7	5.8	3.5	3.5	5.0	5.0	7.0	10.5	12.0	12.0	23.2
							FEMALES						
WHITE													
1	189	1.328	10.2	2.8	6.0	7.0	7.0	8.0	10.0	12.0	13.0	13.5	15.5
2	203	1.434	10.6	2.6	7.0	7.5	8.0	9.0	10.0	12.0	13.5	14.0	15.0
3	211	1.438	11.1	2.6	7.0	8.0	8.5	9.0	11.0	13.0	13.5	14.0	15.0
4	204	1.339	10.8	2.6	7.5	8.0	8.0	9.0	10.5	12.0	13.0	14.5	16.0
5	224	1.416	10.7	3.7	6.0	7.0	8.0	8.5	10.0	12.0	13.0	15.0	17.5
6	125	1.445	10.6	3.3	6.5	7.0	7.5	8.0	10.5	12.0	13.0	14.0	16.0
7	122	1.507	10.9	4.2	4.0	6.0	7.0	8.0	11.0	12.0	15.0	15.5	17.5
8	117	1.507	12.4	4.7	7.0	8.0	8.0	9.0	11.5	15.0	16.5	18.0	22.0
9	129	1.751	13.6	4.6	7.5	8.0	9.0	10.0	13.0	16.0	18.0	20.0	22.0
10	148	1.855	13.4	4.8	7.5	8.0	8.5	10.0	12.5	15.5	19.0	20.0	23.0
11	122	1.569	14.9	6.1	8.0	8.5	9.0	10.0	13.0	17.5	20.5	24.5	28.5
12	128	1.506	15.2	5.6	8.0	9.0	10.0	11.0	14.0	18.5	20.0	23.0	26.0
13	153	1.886	16.2	6.8	7.0	8.0	10.0	11.5	15.0	20.0	24.0	25.0	28.5
14	132	1.731	17.8	7.3	9.0	9.5	10.5	13.0	16.7	21.0	24.0	28.5	33.0
15	125	1.752	17.7	6.7	9.0	10.5	11.0	13.0	17.0	21.0	24.0	25.0	28.5
16	141	1.933	18.2	6.6	100	10.5	12.5	14.0	17.0	21.0	24.0	26.0	32.1
17	117	1.549	19.8	8.0	10.0	12.5	12.5	13.5	19.0	24.0	26.5	29.5	35.0
BLACK													
1	73	257	10.0	3.0	5.5	5.5	7.0	8.0	10.0	12.0	13.0	14.0	15.0
2	66	261	10.0	2.3	7.0	8.0	8.0	8.0	10.0	11.0	12.0	14.0	15.5
3	78	245	9.7	2.9	6.0	7.0	7.0	8.0	10.0	11.0	12.0	13.0	14.0
4	73	246	8.8	2.7	5.0	6.0	7.0	7.0	8.0	10.5	12.0	13.0	14.0
5	88	265	9.4	3.9	5.0	5.0	6.5	7.0	8.0	10.0	12.0	13.5	17.0
6	50	336	9.0	3.1	5.5	6.0	6.0	8.0	8.0	10.0	11.5	12.0	13.0
7	46	241	10.1	4.0	5.0	6.0	7.0	7.5	9.0	11.0	17.5	18.0	18.0
8	35	293	11.5	5.1	5.0	6.5	7.0	8.0	10.0	13.5	18.0	18.0	23.0
9	41	247	10.2	5.1	5.5	6.0	6.0	6.5	8.0	12.0	18.0	18.0	20.0
10	48	303	11.7	5.6	6.5	6.5	7.0	7.5	10.0	16.0	18.0	19.0	24.0
11	42	315	12.7	6.4	4.0	5.0	6.5	7.5	10.0	18.0	22.0	23.0	23.0
12	47	284	13.6	7.6	5.5	6.0	6.0	7.5	12.0	17.0	22.0	25.0	30.0
13	44	287	16.1	7.0	7.0	8.5	10.0	11.0	14.0	18.0	24.0	24.0	33.5
14	50	265	15.9	6.7	8.0	8.0	9.0	10.5	14.0	20.5	24.0	24.5	24.5
15	46	411	14.0	7.6	6.5	6.5	8.0	10.0	12.5	16.0	16.5	20.0	32.8
16	33	203	18.9	8.0	8.0	8.0	10.0	12.0	19.0	24.0	24.5	33.0	33.1
17	39	239	16.9	6.6	7.5	9.0	11.0	12.0	14.5	20.0	24.0	28.0	31.0

APPENDIX B3 TRICEPS SKINFOLD THICKNESS: ADULTS, UNITED STATES: 1971 - 1974

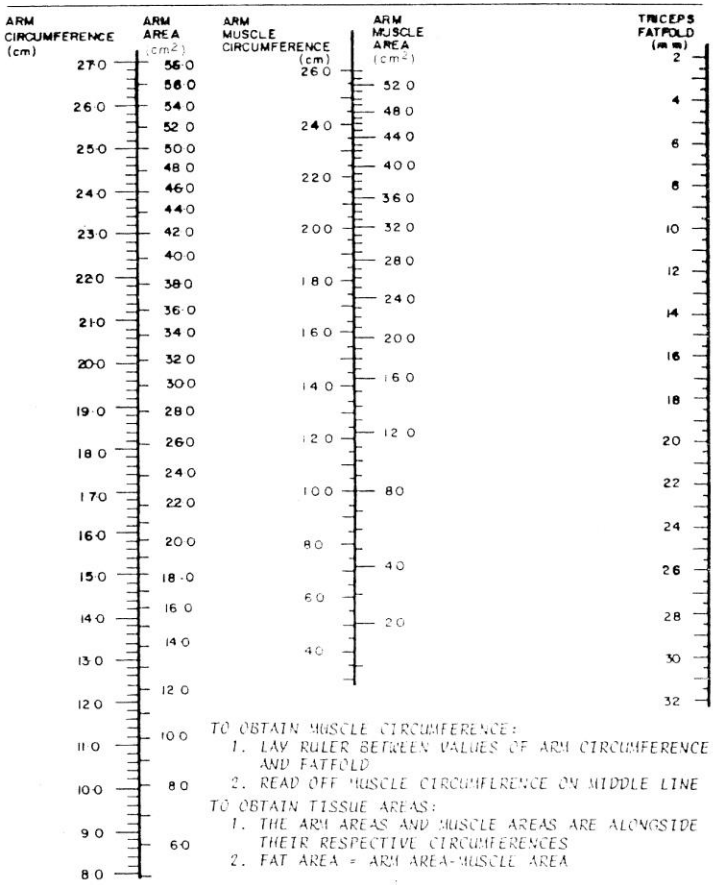
Race and age in years	Number in sample	Estimated Population in thousands	Mean	Standard Deviation	Percentile 5th	10th	15th	25th	50th	75th	85th	90th	95th
					MALES	Triceps skinfolds in Millimeters							
WHITE													
	4.344	54.694	12.2	5.8	5.0	6.0	6.5	8.0	11.0	15.0	18.0	20.0	23.0
18-19	203	3.206	11.3	5.9	5.0	5.5	6.0	7.0	9.0	15.0	18.0	20.0	23.0
20-24	423	7.094	11.5	6.0	4.0	5.0	6.0	7.0	10.0	15.0	18.0	21.0	23.0
25-34	672	11.594	12.7	6.2	5.0	6.0	6.5	8.0	12.0	16.0	18.5	21.0	24.0
35-44	569	9.516	12.6	5.4	5.0	6.0	7.0	9.0	12.0	15.5	17.5	20.0	23.0
45-54	628	10.039	12.6	5.9	5.5	6.5	7.0	8.5	11.0	15.0	18.0	20.0	26.0
55-64	505	8.275	11.7	5.0	5.0	6.0	7.0	8.0	11.0	14.0	16.5	18.0	21.0
65-74	1.344	4.970	12.0	5.4	5.0	6.0	7.0	8.0	11.0	15.0	17.0	19.0	22.0
BLACK													
	847	5.753	10.6	7.0	3.5	4.0	4.5	6.0	8.5	13.0	16.0	20.0	23.0
18-19	52	404	8.9	6.7	2.0	4.0	5.0	5.1	7.0	8.0	12.0	21.0	24.0
20-24	80	866	10.0	7.9	3.0	4.0	4.0	6.0	8.0	11.0	13.0	18.0	24.0
25-34	119	1.232	11.8	8.4	4.0	4.0	4.0	5.0	10.0	15.0	20.0	22.0	23.0
35-44	87	1.005	11.3	6.5	4.0	4.5	5.0	7.0	10.0	14.0	17.0	18.4	22.0
45-54	130	1.057	10.0	5.1	4.0	4.0	5.0	6.0	10.0	12.5	14.0	16.0	20.0
55-64	85	703	10.7	7.2	3.0	4.0	4.5	5.0	8.0	14.0	20.0	22.0	26.0
65-74	294	486	9.7	5.4	4.0	4.5	5.0	6.0	9.0	12.0	14.0	15.0	19.5
							FEMALES						
WHITE													
	6.757	59.923	22.9	8.1	11.0	13.0	14.5	17.0	22.0	28.0	31.0	34.0	37.0
18-19	208	3.159	18.9	6..6	9.5	12.0	13.0	14.5	18.0	22.5	24.0	26.5	33.5
20-24	956	7.972	19.8	7.7	10.0	11.0	12.0	14.0	19.0	24.0	27.9	30.5	34.0
25-34	1.539	12.161	21.8	8.0	11.0	12.5	14.0	16.0	20.5	26.0	30.0	33.0	36.5
35-44	1.302	10.111	23.7	8.3	12.0	14.0	15.9	18.0	22.5	29.0	32.0	35.1	38.5
45-54	7.5	10.879	25.3	8.1	13.0	15.0	17.0	20.0	25.0	30.0	33.5	35.5	39.5
55-64	551	9.037	24.6	7.9	11.5	14.5	16.0	19.0	24.0	30.0	33.0	34.1	38.0
65-74	1.496	6.603	23.3	7.3	12.0	14.0	16.0	18.0	23.0	28.0	31.0	33.0	35.5
BLACK													
	1.557	7.302	23.7	10.3	9.0	11.0	12.0	15.5	23.0	30.5	34.0	36.6	41.0
18-19	70	504	16.2	7.3	8.0	9.0	9.0	11.5	14.0	20.0	25.0	29.0	32.0
20-24	259	1.073	19.3	8.7	9.0	10.0	11.5	12.5	17.0	24.5	28.6	32.0	36.0
25-34	335	1.646	22.5	9.6	8.5	10.0	12.0	14.0	22.0	30.0	32.6	34.1	40.0
35-44	334	1.318	25.8	9.2	11.5	13.0	16.0	20.0	25.5	32.0	35.0	36.5	41.0
45-54	126	1.237	26.8	9.8	12.0	14.0	17.0	20.0	26.0	34.0	37.1	40.0	42.2
55-64	115	871	28.2	12.9	10.0	11.0	13.0	19.0	28.0	34.0	40.0	45.0	51.5
65-74	318	652	23.8	9.0	7.5	11.5	15.0	17.5	24.0	30.0	32.2	35.5	40.0

APPENDIX B4 PERCENTILES FOR UPPER ARM CIRCUMFERENCE AND ESTIMATED UPPER ARM MUSCLE CIRCUMFERENCE OF WHITES IN THE UNITED STATES HEALTH AND NUTRITION EXAMINATION SURVEY I, 1971 - 1974

Age Group	Arm circumference (mm)							Arm muscle circumference (mm)						
	5	10	25	50	75	90	95	5	10	25	50	75	90	95
Males														
1- 1.9	142	146	150	159	170	176	183	110	113	119	127	135	144	147
2- 2.9	141	145	153	162	170	176	185	111	114	122	130	140	146	150
3 - 3.9	150	153	160	167	175	184	190	117	123	131	137	143	148	153
4 - 4.9	149	154	162	171	180	186	192	123	126	133	140	148	156	159
5 - 5.9	153	160	167	175	185	195	204	128	133	140	147	154	162	169
6 - 6.9	155	159	167	179	188	209	228	131	135	142	151	161	170	177
7 - 7.9	162	167	177	187	201	223	230	137	139	151	160	168	177	190
8 - 8.9	162	170	177	190	202	220	245	140	145	154	162	170	182	187
9 - 9.9	175	178	187	200	217	249	257	151	154	161	170	183	196	202
10 - 10.9	181	184	196	210	231	262	274	156	160	166	180	191	209	221
11 - 11.9	186	190	202	223	244	261	280	159	165	173	183	195	205	230
12 - 12.9	193	200	214	232	254	282	303	167	171	182	195	510	223	241
13 - 13.9	194	211	228	247	263	286	301	172	179	196	211	226	238	245
14 - 14.9	220	226	267	253	283	303	322	189	199	212	223	240	260	264
15 - 15.9	222	229	244	264	284	311	320	199	204	218	237	254	266	275
16 - 16.9	244	248	261	278	303	324	343	213	225	234	249	269	287	296
17 - 17.9	246	253	267	285	308	336	347	224	231	245	258	273	294	312
18 - 18.9	245	260	276	297	321	353	379	226	237	252	264	283	298	324
19 - 24.9	262	271	288	308	331	355	372	238	245	257	273	289	309	321
25 - 34.9	271	281	300	319	342	362	375	242	250	264	279	298	314	326
35 - 44.9	278	287	305	326	345	363	374	247	255	269	286	302	318	327
45 - 54.9	267	281	301	322	342	362	376	239	249	265	281	300	315	326
55 - 64.9	258	273	296	317	336	355	369	236	245	260	278	295	310	320
65 - 74.9	248	263	285	307	325	344	355	223	235	251	268	284	298	306
Females														
1- 1.9	138	142	148	156	164	172	177	105	111	117	124	132	139	143
2- 2.9	142	145	152	160	167	176	184	111	114	119	126	133	142	147
3 - 3.9	143	150	158	167	175	183	189	113	119	124	132	140	146	152
4 - 4.9	149	154	160	169	177	184	191	115	121	128	136	144	152	157
5 - 5.9	153	157	165	175	185	203	211	125	128	134	142	151	159	165
6 - 6.9	156	162	170	176	187	204	211	130	133	138	145	154	166	171
7 - 7.9	164	167	174	186	199	216	231	129	135	142	151	160	171	176
8 - 8.9	168	172	183	195	214	247	261	138	140	151	160	171	183	194
9 - 9.9	178	182	194	211	224	251	260	147	150	158	167	180	194	198
10 - 10.9	174	182	193	210	228	251	265	148	150	159	170	180	190	197
11 - 11.9	185	194	208	224	248	276	303	120	158	171	181	196	217	223
12 - 12.9	194	203	216	237	256	282	294	162	166	180	191	201	214	220
13 - 13.9	202	211	223	243	271	301	338	169	175	183	198	211	226	240
14 - 14.9	214	223	237	252	272	304	322	174	179	190	201	216	232	247
15 - 15.9	208	221	239	254	279	300	322	175	178	189	202	215	228	244
16 - 16.9	218	224	241	258	283	318	334	170	180	190	202	216	234	249
17 - 17.9	220	227	241	264	295	324	350	175	183	194	205	221	239	257
18 - 18.9	222	227	241	258	281	312	325	174	179	191	202	215	237	245
19 - 24.9	221	230	247	265	290	319	345	179	185	195	207	221	236	249
25 - 34.9	233	240	256	277	304	342	368	183	188	199	212	228	246	264
35 - 44.9	241	251	267	290	317	356	378	186	192	205	218	236	257	272
45 - 54.9	242	256	274	299	328	362	384	187	193	206	220	238	260	274
55 - 64.9	243	257	280	303	335	367	385	187	196	209	225	244	266	280
65 - 74.9	240	252	274	299	326	356	373	185	195	208	225	244	264	279

APPENDIX B5: ARM ANTHROPOMETRY FOR CHILDREN

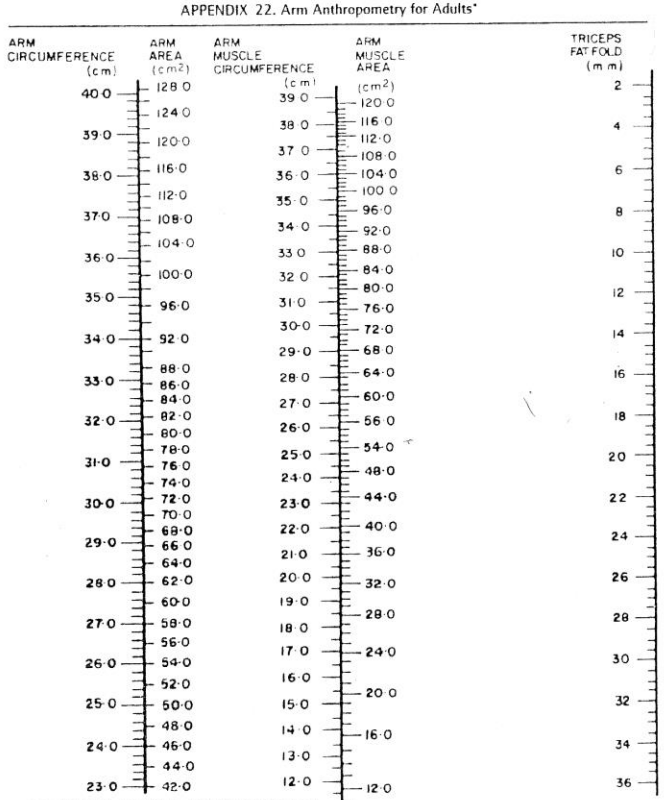
APPENDIX 21. Arm Anthropometry for Children*



* From Gurney JM and Jelliffe DB: Arm anthropometry in nutritional assessment: Nomogram for rapid calculation of muscle circumference and cross-sectional muscle fat areas. Am J Clin Nutr 26:913, 1973.

APPENDIX B6: ARM ANTHROPOMETRY FOR ADULTS

APPENDIX 22. Arm Anthropometry for Adults*



TO OBTAIN MUSCLE CIRCUMFERENCE:

1. LAY RULER BETWEEN VALUE OF ARM CIRCUMFERENCE AND FATFOLD
2. READ OFF MUSCLE CIRCUMFERENCE ON MIDDLE LINE

TO OBTAIN TISSUE AREAS:

1. THE ARM AREA AND MUSCLE AREA ARE ALONGSIDE THEIR RESPECTIVE CIRCUMFERENCES
2. FAT AREA = ARM AREA - MUSCLE AREA

* From Gurney JM and Jelliffe DB: Arm anthropometry in nutritional assessment: Nomogram for rapid calculation of muscle circumference and cross-sectional muscle fat areas. Am J Clin Nutr 26:913, 1973.

APPENDIX C: BMR NOMOGRAM

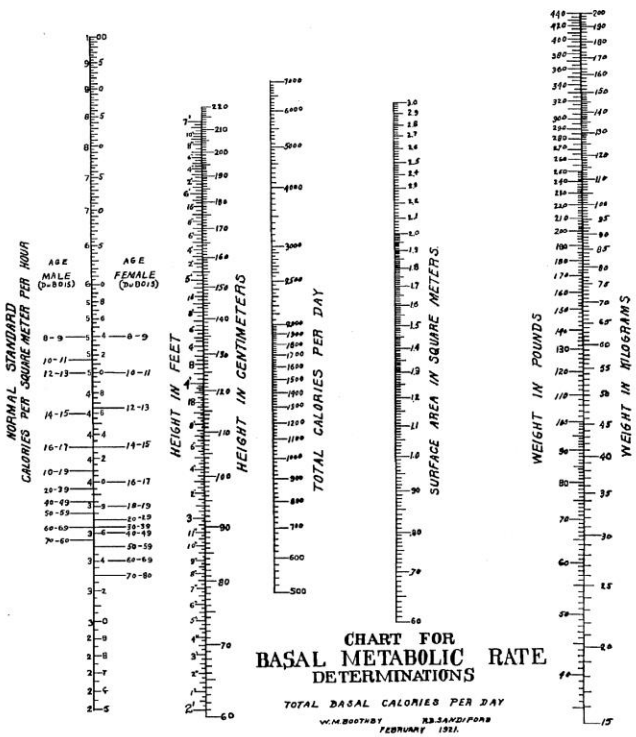


Figure 1-7. Place the chart on a flat, smooth table. Use only a ruler with a true straight edge. Do not draw lines on the chart but merely indicate their positions by the straight edge of the ruler. Locate the various points by means of needles (pin stuck through the eraser of a lead pencil). Locate the patient's normal weight on the scale on the right and his height on the scale second from the left. The ruler joining these two points intersects the scale second from the right at the patient's surface area. Locate the age and sex of the patient on the scale on the left. A ruler joining this point with the point already determined for the patient's surface area crosses the scale third from the left at the *basal* energy requirement. To convert kilocalories (kcal) to kJ., multiply by 4.184. (From Boothby, W. M., and Sandiford, R. B.: Nomographic charts for the calculation of the metabolic rate by the gasometer method. Boston Med. Surg. J., *185*:337, 1921.)

1.1.2 Estimating body weight of patients with oedema (After James 1989)

Patients with peripheral oedema		Patients with ascites	
Mild	ABW - 1,0kg	Minimal	ABW - 2,2kg
Moderate	ABW - 5,0kg	Moderate	ABW - 6,0kg
Severe	ABW - 10,0kg	Severe	ABW - 14,0kg

ABW: actual body weight

	Waterlow	
Grade of malnutrition	**% WFH**	**% HFA**
Normal	90 to 110%	>95%
Mild	80 to 89%	90 to 94%
Moderate	70 to 79%	85 to 89%
Severe	< 70%	<85%

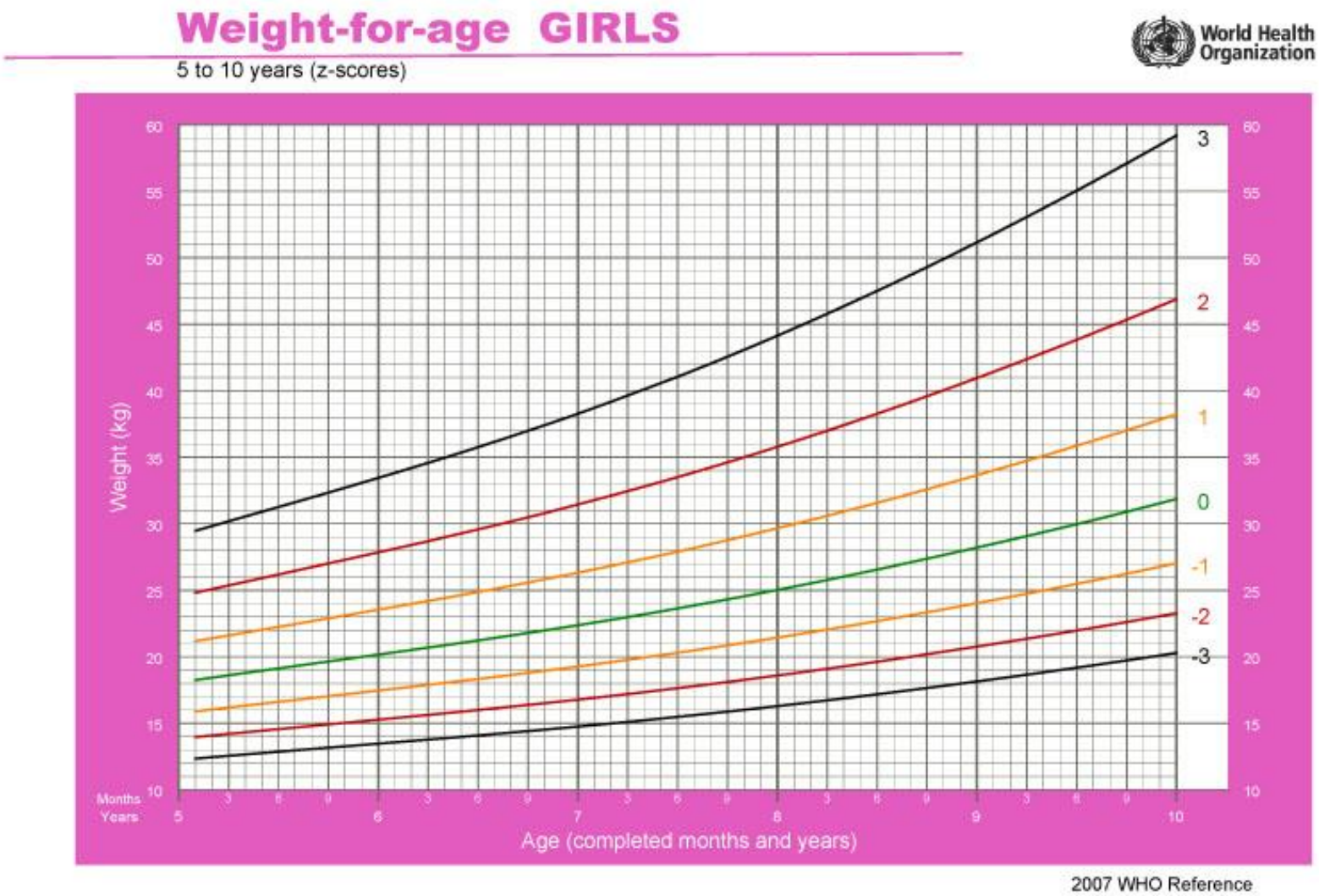
BODY MASS INDEX (Garrow, James & Ralph 2000 by Golden & Golden 2000 p515; Centre for Diseases Control and Prevention, 2011)

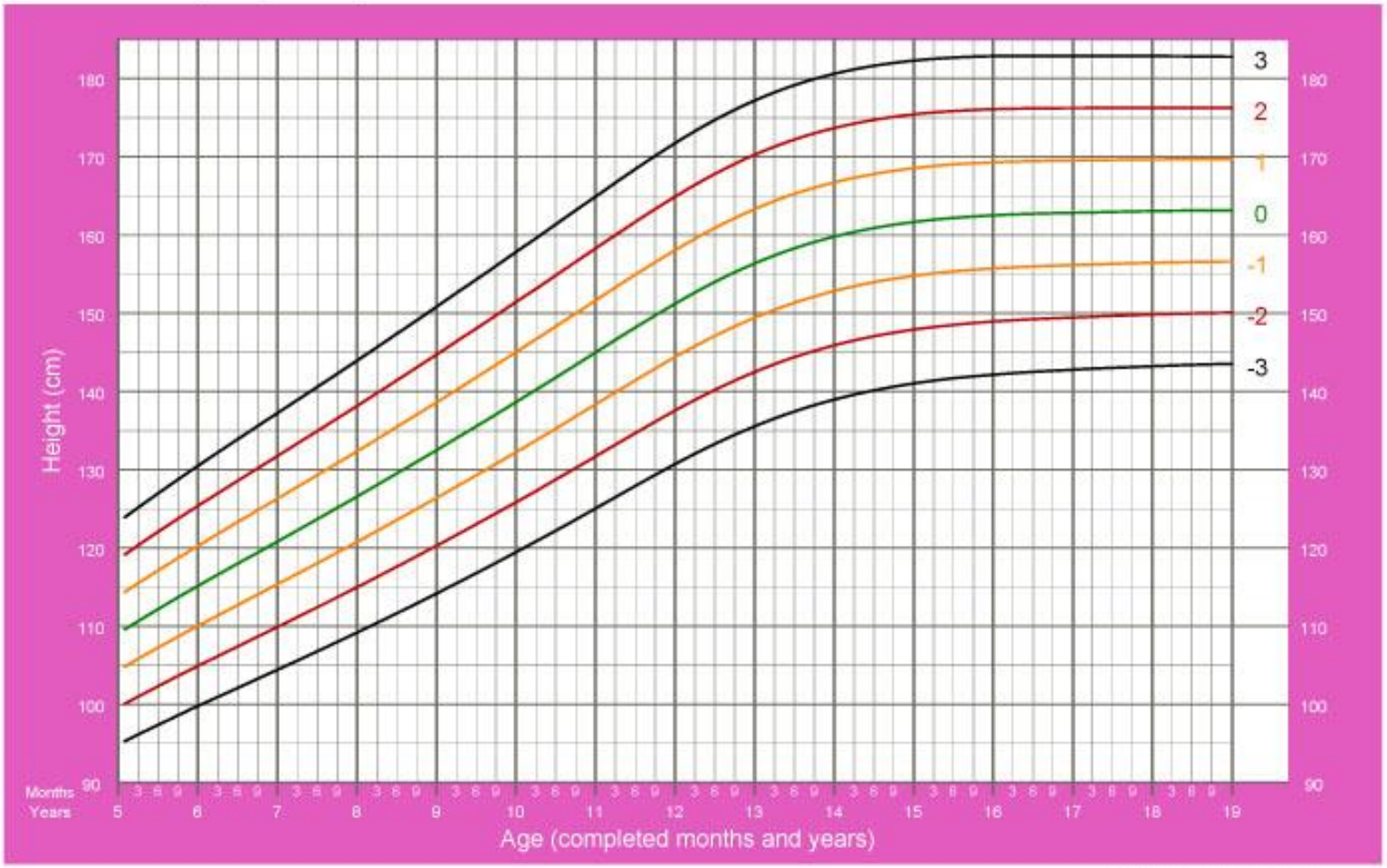
Body Mass Index (kg/m^2)	Classification	Risk of Co-morbidities
< 16	Severe Malnutrition	
16 - 17	Moderate Malnutrition	Low (but risk of other clinical problems increase)
17 – 18.5	Mild Malnutrition	
18.5– 24.9	Normal	
> 25	Overweight	
25 – 30	Pre-Obese	Increased
30 – 35	Obese Class I	Moderate
35 – 40	Obese Class II	Severe
>40	Obese Class III	Very Severe

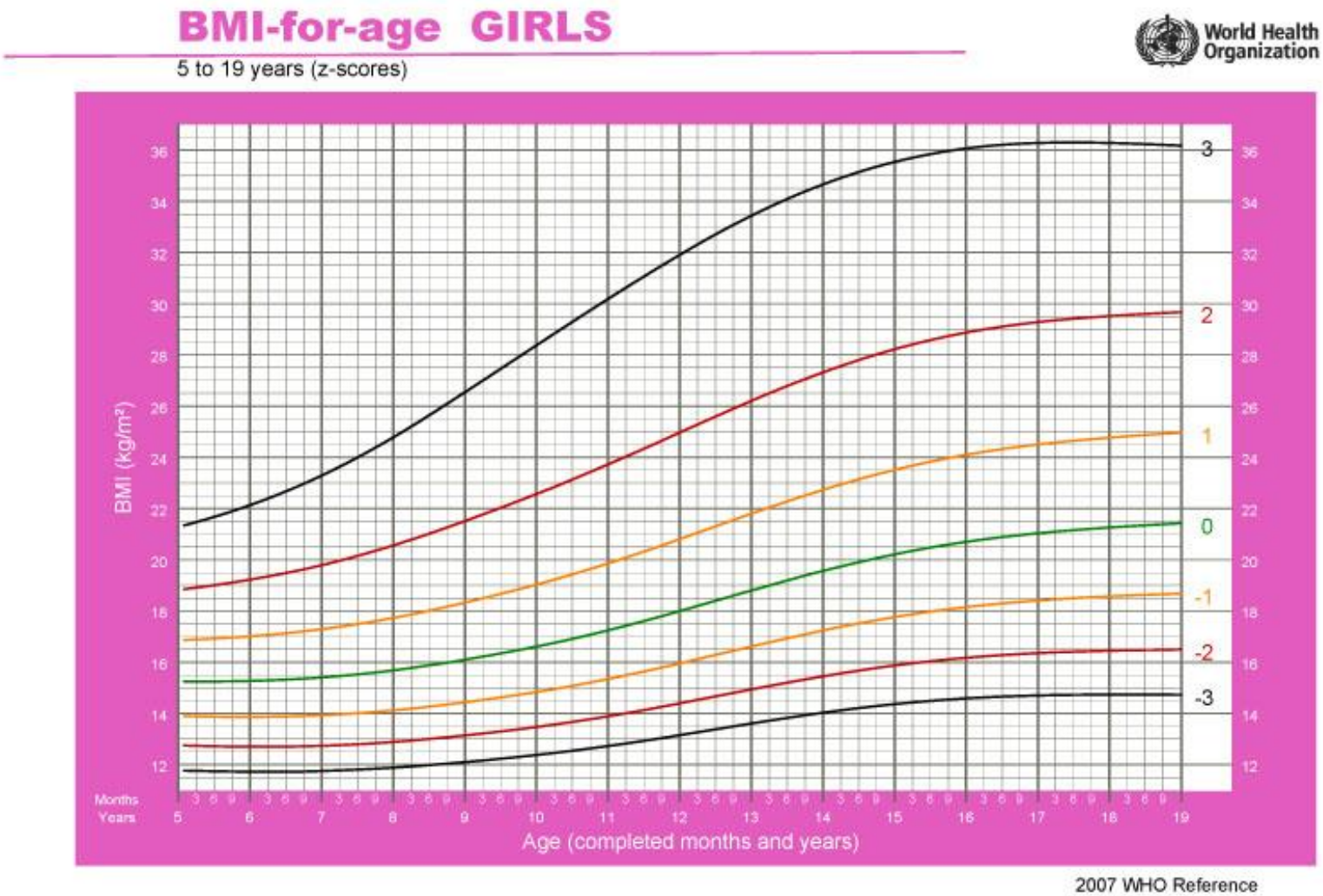
Wellcome

Weight for Age (Gomez)	With oedema	Without oedema
60-80%	Kwashiorkor	Undernutrition

<60%	Marasmic-kwashiorkor	Marasmus




Height-for-age GIRLS
5 to 19 years (z-scores)
World Health Organization
Height (cm)
Months
Years
Age (completed months and years)
3
2
1
0
-1
-2
-3
2007 WHO Reference


BMI-for-age GIRLS
5 to 19 years (z-scores)
World Health Organization
BMI (kg/m²)
3
2
1
0
-1
-2
-3
Months
Years
Age (completed months and years)
2007 WHO Reference

SCHOFIELD EQUATION FOR CHILDREN– SICK OR HOSPITALISED INFANTS AND CHILDREN

(Shaw & Lawson 2007, p64; Leonberg BL 2008; ADA pocket guide to paediatric nutrition assessment, ADA, Philadelphia: 146-147)

Schofield Equation = Basal Metabolic Rate + Physical Activity + Stress Factor

Basal Metabolic Rate Equations

If accurate weight is available: W = Weight (kg) H = Height (m)

	Energy Requirements (kJ/kg/day)	
Age	Males	Females
< 3 years	[(59.512 x W) - 30.4] x 4.18	[(58.317 x W) - 31.1] x 4.18
3 – 10 years	[(22.7 x W) + 504.3] x 4.18	[(22.706 x W) + 485.9] x 4.18
10 – 18 years	[(17.5 x W) + 651] x 4.18	[(17.686 x W) + 692.6] x 4.18

W = weight (kg)

If accurate weight and height are available:

	Energy Requirements (kJ/kg/day)	
Age	Males	Females
< 3 years	[(0.167 x W) + (1517.4 x H) - 616.6] x 4.18	[(16.252 x W) + (1023.3 x H) - 413.5] x 4.18
3 – 10 years	[(19.59 x W) + (130.3 x H) + 414.9] x 4.18	[(16.969 x W) + (161.8 x H) + 371.2] x 4,18
10 – 18 years	[(16.25 x W) + (137.2 x H) + 515.5] x 4.18	[(8.365 x W) + (465 x H) + 200.0] x 4.18

Stress Factors	
Burns	50-150%
Closed head injury	30%
Growth failure	50-100%
Sepsis	20-60%
Starvation	-15 to -30%
Surgery	5-50%
Trauma	10-80%
Ventilated with temperature – Shaw and Lawson(2007) pg 63	Add 10% for every 1ºC above body temperature of 37.3 ºC

Physical Activity Factors	
Sleeping (ICU, sedation and muscle relaxation)	+ 0%
Hospitalised: Not ambulant	+ 20%
Hospitalised: Ambulant	+ 30%
At home: Relatively inactive	+ 40%
At home: Very active	+ 90%

MAXIMAL GLUCOSE OXIDATION RATES that must not be exceeded (Shaw and Lawson 2007, pg 145 , 391 ; Jain 2010)

Age	Glucose (mg/kg/min)
Neonates	12
Infants< 1 year	8 – 9
Toddlers and Children	5 – 7
Adolescents	4

¶
Paediatrics¶
¶
{Nutritional·requirements·for·paediatric·neurosurgical·patients}¶
¶

Energy·¤	Use·childrens·schofield¤
Protein¤	1.5·-·3.0g/kg/IBW¤
Carbohydrate¤	45·-·50%·of·total·energy¤
Fat¤	40·-·45%·(up·to·6·years·of·age)·of·total·energy¤

MACRONUTRIENT REQUIREMENTS Protein

Macronutrients	Requirements (g/kg/day)	
Protein	Metabolic Status	Requirement
	Normal	1 (0.87 – 1.25)
	Hypermetabolic: 0-25% 25-50% >50%	1.25 (1.0 – 1.5) 1.5 (1.25 – 1.87) 1.87 (1.56 – 1.87)
	Depleted	1.87 (1.25 – 2.5)
Carbohydrate	50-60% of total energy	
Lipids	30% of total energy	

SCHOFIELD EQUATION (Thomas & Bishop 2007, p858)

Basal Metabolic Rate Equations

Age	Males kJ/day	Females kJ/day
10 – 17 years	(17.7 x W + 657) x 4.18	(13.2 x W + 692) x 4.18
18 - 29 years	(15.1 x W + 692) x 4.18	(14.8 x W + 487) x 4.18
30 - 59 years	(11.5 x W + 873) x 4.18	(8.3 x W + 846) x 4.18
60 – 74 years	(11.9 x W + 700) x 4.18	(9.2 x W + 687) x 4.18
75+ years	(8.4 x W + 821) x 4.18	(9.8 x W + 624) x 4.18

Metabolic Rate Adjustments

Stress Factors	
Simple starvation[1]	-15%
Surgery / post operative – no complications[1]	+5 - 15%
Surgery / post operative –complications[2]	+25 - 40%
Elective surgery[1]	+5 - 15%
Pressure ulcers: Stage I[1]	0 – 10%
Pressure ulcers: Stage II[1]	+20%
Pressure ulcers: Stage III[1]	+30 – 40%
Pressure ulcers: Stage IV[1]	+50 – 60%
Closed head injury[1]	+30%
Multiple trauma[1]	+40%
Systemic inflammatory response syndrome (SIRS) [1]	+50%
Sepsis[1]	+ 20-40%
Major burns[1]	+80 – 100%
Brain injury: acute and ventilated[2]	0 – 30%
Brain injury: during recovery[2]	+5 – 50%
Cerebral haemorrhage[2]	+30%
CVA[2]	+5%
COPD[2]	+15 – 20%
ICU: Ventilated[2]	0 – 10%
Leukaemia[2]	+25 – 34%
Lymphoma[2]	0 – 25%

Solid tumour	0 – 20%
Cancer[3]	+10 – 45%
Infection[2]	+25 – 45%
Chronic pancreatitis[2]	+3%
Acute pancreatitis[2]	+10%
Transplantation[2]	+20%
Abscess[2]	+20%
IBD[2]	0 – 10%
Peritonitis[3]	+5 – 25%
Multiple/long bone fractures[3]	+10 – 30%
Fever[3]	+20% per 1°C above 37°C
Asymptomatic HIV[4]	+10%
Symptomatic HIV[4]	+20 – 30%
Liver disease[5]	30%

[1]Mahan&Escott-Stump 2008, p873
[2]Thomas & Bishop 2007, p860
[3] ADA 2000
[4] WHO
[6]Plauth M, Cabre E, Campillo B, Kondrup J, Marchesini G, Schu T, Shenkin A, Wendon J. 2009)

Physical Activity Factors: To account for the thermic effect of exercise	
Patient on ventilator (BDA 1988: Adams: 70)	-15%
Patient unconscious (BDA 1988: Adams: 70)	BMR only
Bed bound – immobile(Thomas & Bishop 2007, p73)	+10%
Bed bound – immobile, but can move and sit up	+15 – 20%
Mobile on ward	+ 30%

CLASSIFICATION OF FRAME SIZE

Classification	Frame Size	
	Males	Females
Small	> 10.4	>11.0
Medium	9.6 – 10.4	10.1 – 11.0
Large	< 9.6	< 10.1

Table 4.
Fiftieth (50th) Percentile of Standard Body Weight for MEN

Age	25–54 years	55–74 years
	Weight (kg)	

Table 5.
Fifthieth (50th) Percentile of Standard Body Weight for WOMEN

Age	25–54 years	55–74 years
	Weight (kg)	

Group	Energy (kJ)	Protein (g)	Fat (g)	CHO (g)	PO4 (mg)	Na (mg)	K (mg)
Meat & meat substitutes							
Meat - high P, low Na	350	7	5	0	120	55	90
Meat - high P, high Na	350	7	5	0	120	430	90
Meat - low P, low Na	350	7	5	0	65	55	90
Meat - low P, high Na	350	7	5	0	65	430	90
Legumes low Na	350	7	5	15	120	55	245
Legumes high Na	350	7	5	15	120	430	245
Milk							
low kJ, fat, CHO	325	4	5	10	110	65	185
high kJ, fat, CHO	835	4	10	20	110	65	185
Starch							
Starch low K, low kJ, low fat	350	2	0	20	40	70	50
Starch low K, high kJ, high fat	835	2	10	20	40	70	50
Starch high K, low kJ, low fat	350	2	0	20	40	70	245
Starch high K, high kJ, high fat	835	2	10	20	40	70	245
Vegetables							
Vegetables low K	90	1	0	2	20	20	75
Vegetables moderate K	90	1	0	2	20	20	150
Vegetables high K	90	1	0	2	20	20	270

Fruit							
Fruit low K	250	0.5	0	10	15	5	95
Fruit moderate K	250	0.5	0	10	15	5	170
Fruit high K	250	0.5	0	10	15	5	240
Beverages							
Beverages low kJ	10	0	0	0	5	10	20
Beverages high kJ	300	0	0	10	5	10	20
Sugar	155	0	0	10	0	0	10
Fat	160	0	5	0	0	45	0