

The Advanced Body Composition® report, available with the BodyLogic scan, offers comprehensive measurements of the body, including the precise location of bone, fat, and muscle mass. This document breaks down the data so you can address questions about the report and advise your clients with confidence.

What are the Adipose Indices on the Advanced Body Composition® report and how are they used?

When looking at the Adipose Indices on the Advanced Body Composition® report, keep in mind that the lower the numbers in the AM percentile column, the less fat there is compared to others of the same age. More specifically:

- **Total Body % Fat:** Indicates a client's fat mass/total mass.
- **Fat Mass/Height²:** This refers to a client's Fat Mass Index. It is a more accurate measure of obesity than Body Mass Index (BMI) because it calculates the amount of fat a client has relative to their height instead of total weight relative to height. The higher this number, the more fat they have.
- **Android/Gynoid ratio:** This measurement indicates whether a client is an "apple shape" vs. "pear shape," with "Android" meaning abdomen and "Gynoid" meaning thighs. A value >1 indicates a client is more "apple shaped" which could mean a higher risk for cardiovascular disease, while a value <1 indicates more of a "pear shape".
- **% Fat Trunk/% Fat Legs and Trunk/Limb Fat Mass Ratio:** While these measurements aren't vitally important to everyday health monitoring, they demonstrate the distribution of fat in a client's body and can be used clinically to track lipodystrophy.
- **EST VAT Mass, Volume, and Area:** These are measurement of visceral fat, the "bad fat" around the insides of organs. VAT area (cm²) > 100cm² has been shown to be associated with an increased risk of metabolic syndrome and coronary heart disease.

What are the Lean Indices on the Advanced Body Composition® report and how are they used?

When looking at the Lean Indices on the Advanced Body Composition® report, keep in mind that the higher the numbers in the AM percentile column, the more muscle there is compared to others of the same age. More specifically:

- **Lean/Height² = Lean Mass Index:** Amount of lean mass a client has relative to height. The higher this number, the more muscle they have.
- **Appen. Lean/Height² (kg/m²):** The measurement of functional muscle in a client's appendices (legs and arms) relative to their height. This value is linked to physical performance and is used clinically to monitor sarcopenia or other muscle disabilities. The higher the number, the more functional muscles a client has.

Advanced Body Composition® Report Interpretation Guide

Why is the % body fat higher with the BodyLogic scan? Other methods, such as calipers or BodPod, measure much less.

The BodyLogic scan is so accurate that it measures all fat in the body, both essential fat and storage fat. Storage fat is the fat clients want to lose, but humans need a certain amount of fat to survive - this is called “essential fat.” It is found in places like cell membranes, the central nervous system, the heart and lungs, and digestive system. On average, about 4% of body fat in men and 12% body fat in women is considered essential fat.

What are normal and not-normal values on a BodyLogic scan?

For Total Body %, use the age matched graph on the top of the Advanced Body Composition® report as a reference. If your client falls in the dark blue area, that means he/she is leaner than 50% of people their age. If they fall in the light blue area, that means they have more body fat than 50% of people in their age range. The line in the middle is equal to the mean body fat % for their gender.

Fat Mass Index ¹					
	Normal	Excess Fat	Obese Class I	Obese Class II	Obese Class III
Men	2.7 - 5.5	5.5 - 8.2	8.2 - 10.9	10.9 - 13.6	>13.6
Women	4.5 - 8.2	8.2 - 11.8	11.8 - 15.4	15.4 - 19.1	>19.1

FMI values calculated with the default Classic calibration setting.

Visceral Fat Area ²		
Normal	Increased Risk	High Risk
<100cm ²	100-160cm ²	>160cm ²

Lean Mass Index ³			
	Normal	Medium	High
Men	<18.7	18.7 - 21.0	>21.0
Women	<14.9	14.9 - 17.2	>17.2

1. Kelly et al. Dual energy x-ray absorptiometry body composition reference values from NHANES. PLoS One 4 (9) (2009): e7038. **2.** Nicklas et al. Visceral adipose tissue cutoffs associated with metabolic risk factors for coronary heart disease in women. Diabetes Care 26:1414-1420, 2003. **3.** Coin et al. Fat-free mass and fat mass reference values by dual-energy x-ray absorptiometry (DEXA) in a 20-80 year-old Italian population. Clin Nutr. 2008 Feb;27(1):87-94.

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EXPLANATION OF BODY COMPOSITION ASSESSMENT RESULTS (the last two pages explain how to interpret your follow-up results)

This is only to be used as a guide to help you understand the printout. It should only be used for diagnosis by your family physician.

Dual-Energy X-Ray Absorptiometry (DXA) scans provide a state-of-the-art way to assess body composition. This test will accurately determine overall body fat mass and fat-free mass including specific body segments as well as total body. Your body composition scan will include:

- Total body bone mineral density (BMD)
- Total bone mineral content (BMC)
- Fat mass
- Lean mass
- Percentage of fat

Definitions

T-Score or “young normal” YN

The T-score or YN indicates how your result compares to a healthy normal 20 to 29 year old based on the National Health and Nutrition Examination Survey (NHANES) database. The NHANES data base includes over 20,000 participants, age 8-85, with the data solely collected on Hologic equipment (what we use in our clinic).

Z-Score or “age matched” AM

The Z-score or AM indicates how your result compares to the same gender and age based on NHANES database.

Body Composition

Your body weight = fat mass + fat free mass

Fat free mass (lean) includes skin, organs, bones, blood, muscles, ligaments, tendons and water.

Body Mass Index

BMI less than 18.50	underweight
BMI 18.50 to 24.99	healthy weight
BMI 25.00 to 29.99	overweight
BMI 30 or more	obese

Currently BMI is the standard for measuring clinical obesity, however, problems with BMI are that it is a measure of excess weight, not fat and it is not gender specific. There is a new trend emerging to measure called Body Roundness Index (BRI) which may be a bit more accurate than BMI. Various BRI calculators can be found online.

The following chart provides information on your **Total** (line 8) which can be found in the Body Composition Results on your report.

NORMAL FAT MASS RANGES NHANES (National Health and Nutrition Examination Survey) CLASSIFICATION

Height (cm)	Males (grams)	Females (grams)
150	6800 to 13500	11300 to 20300
152	6900 to 13900	11600 to 20800
154	7100 to 14200	11900 to 21300
156	7300 to 14600	12200 to 21900
158	7500 to 15000	12500 to 22500
160	7700 to 15400	12800 to 23000
162	7900 to 15700	13100 to 23600
164	8100 to 16100	13400 to 24200
166	8300 to 16500	13800 to 24800
168	8500 to 16900	14100 to 25400
170	8700 to 17300	14500 to 26000
172	8900 to 17800	14800 to 26600
174	9100 to 18200	15100 to 27200
176	9300 to 18600	15500 to 27900
178	9500 to 19000	15800 to 28500
180	9700 to 19400	16200 to 29200
182	9900 to 19900	16600 to 29800
184	10200 to 20300	16900 to 30500
186	10400 to 20800	17300 to 31100
188	10600 to 21200	17700 to 31800
190	10800 to 21700	18100 to 32500
192	11100 to 22100	18400 to 33200
194	11300 to 22600	18800 to 33900
196	11500 to 23000	19200 to 34600
198	11800 to 23500	19600 to 35300
200	12000 to 24000	20000 to 36000

Understanding the Report

Total Body % Fat (top graph in the right corner of your report)

If your result falls in the dark blue area, that means that you are leaner than 50% of people your age. If you fall in the light blue area, that means that you have more body fat than 50% of people your age. The line in the middle is equal to the mean body fat % for your gender.

Colour Image (image in the left corner of your report)

- Yellow region represents areas with higher % fat
- Orange and Red region represents areas with lower % fat
- Blue region indicates bone

Body Composition Results

Table 1: (some of the results are blank as we were unable to obtain a height on the sample patient)

Understanding % Fat Percentile (last two columns of report)

YN=99% Fat percentile.

This means that 99% of 20 to 29 year old population database has less fat than you or 1% have more fat than you.

AM = 99% Fat percentile

This means that 99% of *gender specific people of your age* have less fat than you or 1% have more fat than you.

Body Composition Results

Region	Fat Mass (g)	Lean + BMC (g)	Total Mass (g)	% Fat	%Fat Percentile YN	AM
L Arm	2727	2240	4967	54.9	96	88
R Arm	2817	2377	5194	54.2	95	87
Trunk	18187	14439	32626	55.7	99	99
L Leg	6410	3808	10219	62.7	99	99
R Leg	6722	3336	10057	66.8	99	99
Subtotal	36862	26200	63062	58.5	99	99
Head	1720	4112	5832	29.5		
Total	38582	30312	68894	56.0	99	99
Android (A)	2903	2374	5277	55.0		
Gynoid (G)	5499	2766	8265	66.5		

Identify muscle imbalance and symmetry

This is the total body fat percentage

This is the total body fat mass in grams

This represents your fat free mass or everything in your body except fat. It includes lean mass and bone mineral content.

Adipose Indices

When looking at the Adipose Indices, keep in mind that the lower the numbers in the AM percentile column, the less fat there is compared to *others of the same age*. The fat mass ratio is not based upon weight it is calculated using the formula fat/height².

Fat Mass Index (FMI) measures excess fat (not including lean mass) and is gender specific.

Visceral Adipose Tissue (VAT) is the type of fat around internal organs and is a hormonally active component of total body fat. This fat is different than the fat under your skin (subcutaneous fat). Increased VAT is associated with medical disorders. *This result is best discussed with your family physician.*

Adipose Indices Report (table 2)

****The YN and AM are interpreted the same as for Body Composition Results****

- Line 1, Total Body % Fat indicates your fat mass/total mass.
- Line 2, Fat Mass/Height² refers to you Fat Mass Index (FMI). It is a more accurate measure of obesity than BMI because it calculates the amount of fat a you have relative to your height instead of total weight to height (BMI). The higher this number, the more fat you have.

FAT MASS INDEX (line 2)

	Normal	Excess Fat	Obese Class I	Obese Class II	Obese Class III
Men	2.7 – 5.5	5.5 – 8.2	8.2 – 10.9	10.9 – 13.6	> 13.6
Women	4.5 – 8.2	8.2 – 11.8	11.8 – 15.4	15.4 – 19.1	> 19.1

- Line 3, Android/Gynoid ratio indicates whether you are an “apple shape” vs “pear shape”, with Android meaning abdomen and Gynoid meaning thighs. A value greater than 1 indicates that you are more “apple-shaped”, which could mean a higher risk for cardiovascular disease, while a value of less than 1 indicates more of a pear shape.
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- Line 4, % Fat Trunk/% Fat Legs and Line 5, Trunk/Limb Fat Mass Ratio. These measurements aren’t vitally important to everyday health monitoring but they demonstrate the distribution of fat in your body.
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- Lines 6, 7, 8, EST Vat Mass, Volume and Area. These are measurement of visceral fat, the “bad fat” around the insides of organs which has been shown to be associated with an increased risk of diabetes and coronary heart disease.

VISCERAL FAT AREA (line 8)

Normal	Increased Risk	High Risk
<100 cm ²	100 – 160 cm ²	>160 cm ²

Table 2: (some of the results are blank as we were unable to obtain a height on the sample patient)

Adipose Indices

Measure	Result	Percentile	
		YN	AM
Total Body % Fat	56.0	99	99
Fat Mass/Height ² (kg/m ²)			
Android/Gynoid Ratio	0.83		
% Fat Trunk/% Fat Legs	0.86	67	42
Trunk/Limb Fat Mass Ratio	0.97	79	49
Est. VAT Mass (g)	724		
Est. VAT Volume (cm ³)	783		
Est. VAT Area (cm ²)	150		

Lean Indices

Table 3: (the results are blank as we were unable to obtain a height on the sample patient)

Lean Indices

Measure	Result	Percentile	
		YN	AM
Lean/Height ² (kg/m ²)			
Appen. Lean/Height ² (kg/m ²)			

The YN and AM are interpreted the same as for Body Composition Results

Line 1, Lean/Height², amount of muscle mass in your body in respect to your height. The higher the number, the more muscle mass you have.

Lean Mass Index

	Normal	Medium	High
Men	<18.7	18.7 – 21.0	>21.0
Women	<14.9	14.9 – 17.2	>17.2

Line 2, Appen Lean/Height², the measurement of functional muscle in your appendices (legs and arms) relative to your height. This value is linked to physical performance. The higher the number, the more functional muscles you have.

Whole Body Bone Density

Table 4:

DXA Results Summary:

Region	Area (cm ²)	BMC (g)	BMD (g/cm ²)	T-score	Z-score
L Arm	165.18	116.34	0.704		
R Arm	198.30	141.56	0.714		
L Ribs	65.41	48.09	0.735		
R Ribs	117.99	103.19	0.875		
T Spine	172.22	129.64	0.753		
L Spine	33.12	30.74	0.928		
Pelvis	91.08	76.37	0.839		
L Leg	170.57	159.51	0.935		
R Leg	125.03	151.25	1.210		
Subtotal	1138.89	956.69	0.840		
Head	220.66	338.19	1.533		
Total	1359.55	1294.88	0.952	-2.0	-1.3

This is the total Bone Mineral Content (BMC) in grams

This is the total Bone Mineral Density (BMD) in grams per cm squared

Your BMD results are compared with two norms – a young healthy population (T-score) and age-matched (Z-score).

T-score indicates how your bone density compares to the optimal or peak bone density of a healthy, young adult of the same sex. T-scores are categorized as follows:

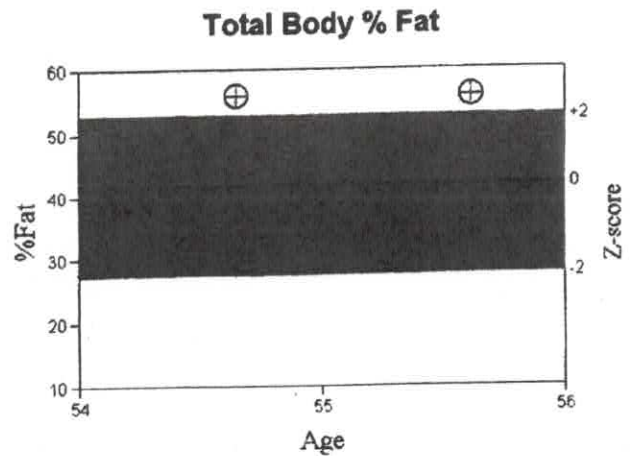
- Above -1: Normal bone density
- Between -1 and -2.5: Indicates osteopenia, a condition where bone density is below normal and may lead to osteoporosis.
- Below -2.5: Indicates osteoporosis, a condition characterized by weak and brittle bones.

A whole body bone density provides you with the total bone mass and Bone Mineral Density **however, it cannot provide a diagnosis of osteoporosis.** The test for osteoporosis should follow World Health Organization (WHO) guidelines which apply to the hip, lumbar spine and forearm. Applying the WHO criterion to the whole body BMD **will underestimate the prevalence of osteoporosis.** *This result is best discussed with your family physician.*

TRACKING YOUR CHANGES IN BODY COMPOSITION (FOLLOW UP SCANS)

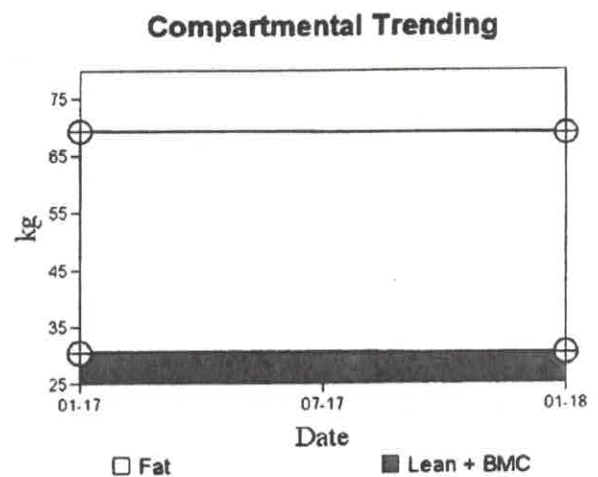
Total Body % Fat

For this example, the patient had two scans. (1) on the graph is the first scan, (2) indicates a scan done approximately a year later. This graph will give you a visual trend to track your progress.



Compartmental Trending

Much the same as the above example (1) and (2) were the first scans, (3) and (4) were done a year later. The white area of the graph is fat, the dark area of the graph is lean + bone mineral content. This graph also gives you a visual trend to track your progress.



TRACKING YOUR CHANGES IN BODY COMPOSITION (FOLLOW UP SCANS)

These graphs will indicate all your results collected over the years, in this example, the patient has only had two scans. The "change vs baseline" indicates the change in all follow up scans compared to the very first scan you had done. The "change vs previous" will show you the comparison between yearly scans.

In this graph, you will have a numerical result that indicates the change in your total body % fat results. In 2017, body fat % was 55.9% and in 2018 was 56%. It again indicates the percentile with young normal and age matched. In this case 99% of young normal adults have less body fat % and 99% of age/gender matched have less body fat %.

The last column indicates a change vs baseline and vs previous. A positive number indicates an increase in body fat %, a negative number indicates a decrease in body fat %.

Total Body % Fat Results

Scan Date	Age	%Fat (%)	Percentile		Change vs	
			YN	AM	Baseline	Previous
08.01.2018	55	56.0	99	99	0.1	0.1
18.01.2017	54	55.9	99	99		

In the next three graphs, there is a change/month vs baseline and vs previous as well as an overall change vs baseline and vs previous. A negative number indicates a decrease in total fat mass, in total lean mass and in total mass, a positive number indicates an increase in total fat mass, in total lean mass and in total mass.

Total Fat Mass Results

Scan Date	Age	Fat Mass (g)	Change/Month vs		Change vs	
			Baseline	Previous	Baseline	Previous
08.01.2018	55	38582	-15	-15	-177	-177
18.01.2017	54	38759				

Total Lean Mass Results

Scan Date	Age	Lean (g)	Change/Month vs		Change vs	
			Baseline	Previous	Baseline	Previous
08.01.2018	55	29017	-18	-18	-207	-207
18.01.2017	54	29224				

Total Mass Results

Scan Date	Age	Mass (g)	Change/Month vs		Change vs	
			Baseline	Previous	Baseline	Previous
08.01.2018	55	68894	-36	-36	-415	-415
18.01.2017	54	69309				

YN = Young Normal

AM = Age Matched