

Body Composition Analysis with the InBody 720

Contra – Indications to testing with InBody

Anyone who has an implantable electrical device such as Pacemaker, Defibrillator, Nerve Stimulator, or women within the first twelve weeks of pregnancy are recommended not to use the device.

Things to keep in mind for accurate measurement with InBody 720

1. Preferably the test should be carried out on an empty stomach & bladder
2. Testing should be carried out before exercise.
3. Testing should not be carried out after a shower or using a sauna as sweat & heat causes a temporary change in conductivity within the body
4. Subsequent testing should be carried out under similar conditions. (i.e. similar clothing, testing time, before eating or exercising etc.)
5. In - putting of age and gender is needed to gain ‘normalized’ ranges for comparison, it does not effect the measurement. **Height needs to be inputted accurately as it will effect the measurement.**
6. Arms need to be away from the side of the body. Not touching body

Age Range 6 years to 99 years

Weight Range 10 to 250 kg (max 39.5 stone)

Body Composition Analysis

Body Composition Analysis

Compartments	Values	Total Body Water	Soft Lean Mass	Fat Free Mass	Weight	Normal Range
I C W (ℓ) <small>Intracellular Water</small>	19.9	32.6	41.7	44.2	65.9	16.8 ~ 20.5
E C W (ℓ) <small>Extracellular Water</small>	12.7					10.3 ~ 12.6
Protein (kg)	8.6	<small>non-osseous</small>				7.2 ~ 8.9
Mineral (kg)	3.00	<small>osseous: 2.49</small>				2.50 ~ 3.10
Body Fat Mass (kg)	21.7					9.8 ~ 19.5

► Mineral is estimated.

InBody 720 gives a quantitative value for the various body compartments which equals the weight of each compartment, when added together they equal the person’s weight. The values can also be compared with the ‘normal’ values.

Total Body Water (TBW)

InBody 720 measures TBW separating it into Intra-cellular and Extra-cellular.

Intra- Cellular = Water in the cells (NB. Muscles are cells, so high muscle mass = high cells = high intracellular water)

Extra- cellular = Water outside the cells (also high if intracellular water is high)

Total Body Water = All the water in the body and is approx 60% of total weight.

Protein

Protein consists of nitrogen and is the main component of Soft Lean Mass.

A lack of protein implies a lack of muscle and / or poor nutrition.

Mineral

InBody analyzes two groups of minerals: osseous mineral and non-osseous minerals. Osseous mineral is bone mineral whereas non-osseous minerals are those found in all other parts of the body. Osseous mineral accounts for about 80% of the body's total minerals.

Mineral mass is closely related to soft lean mass. If you have more lean mass, the weight of bones strengthen which in turn, increases the bone mineral. 720 gives an estimate of bone mineral which has been validated against DEXA. It can be used as a screening tool to detect changes in bone mineral. Low bone mineral is associated with Osteoporosis

Body Fat Mass

Body Fat Mass can be stored under the skin, as well as in the abdomen. When a persons body fat mass is higher than the standard range, they are clinically obese.

Weight

Weight consists of body water, protein, mineral and body fat mass.

Weight = Total Body Water + Protein Mass + Mineral Mass + Body Fat Mass

Muscle - Fat Analysis

The Muscle-Fat Analysis consists of a comparison of weight, skeletal muscle mass, and body fat mass.

Muscle - Fat Analysis

	Under	Normal	Over	UNIT%	Normal Range
Weight (kg)	55 70 85 100 115 130 145 160 175 190 205			65.9	45.8 ~ 62.0
S M M (kg) <small>Skeletal Muscle Mass</small>	70 80 90 100 110 120 130 140 150 160 170			23.9	20.1 ~ 24.5
Body Fat Mass (kg)	40 60 80 100 160 220 280 340 400 460 520			21.7	4.8 ~ 19.5

Weight (kg)

The 100% normal weight refers to the ideal weight for a person given his/her height. It is calculated using the BMI standard weight calculation method. NB Ideal Weight differs from target weight.

$$\text{* BMI Ideal Weight Calculation Method Ideal Weight (kg) = Ideal BMI} \times \text{Height}^2 \text{ (m}^2\text{)}$$

Skeletal Muscle Mass (kg)

100% normal Skeletal Muscle Mass refers to the ideal quantity of Skeletal Muscle Mass for a person's standard weight. There are three types of muscle - cardiac muscle, visceral muscle and skeletal muscle. However, it is the quantity of skeletal muscle that is the most changed through exercise. As such, InBody720 displays Skeletal Muscle Mass separately from Soft Lean Mass.

Body Fat Mass (kg)

100% normal Body Fat Mass refers to the Body Fat Mass that a person should maintain for his/her standard weight.

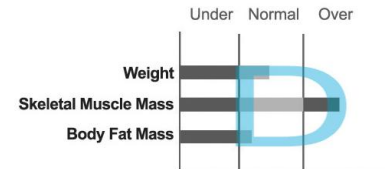
HOW TO APPLY THIS RESULT TO YOUR CLIENTS

Muscle - Fat Analysis		Under	Normal	Over	UNIT: %	Normal Range
Weight (kg)		55 70 85	100	115 130 145 160 175 190 205		44.6 ~ 60.3
S M M Skeletal Muscle Mass (kg)		70 80 90	100	110 120 130 140 150 160 170		19.8 ~ 24.2
Body Fat Mass (kg)		40 60 80	100	160 220 280 340 400 460 520		10.5 ~ 16.8

Draw a line joining the end of each bar graph line.

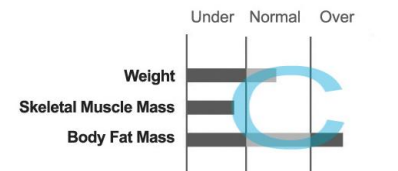
Different body types, based on a balanced body composition

In the case of this body type, the body composition graphs form a slightly curved 'D'. This is the ideal body composition state.



At the opposite end of the health spectrum, we find the following graph shape, a 'C' shape. In this case, the person's weight is within the normal range. However their Muscle mass is low and body fat mass is high.

This person may be recommended to achieve a 'D' shape by losing Body Fat Mass while gaining SMM.



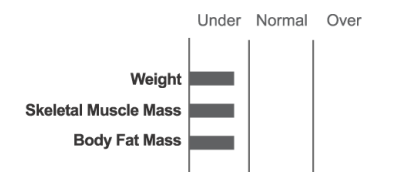
This type is exemplified by a person whose weight is within the standard range, but yet cannot be regarded as being in ideal health. For this type, the length of the SMM graph is shorter than the standard range, while the Body Fat Mass is within the standard range. An examinee of this type will also exhibit a 'C' shape.

However, this person should be identified as having a weak body, and not as being obese. People who belong to this type usually lack exercise and / or proper nutrition. This person may be recommended to achieve a 'D' shape by gaining SMM and examining their diet.



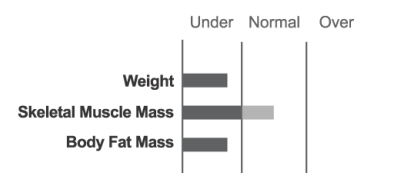
This person displays a straight line below the normal range.

They would be underweight and have a weak body. Poor nutrition like this, continuing for a long period of time, may result in health problems.

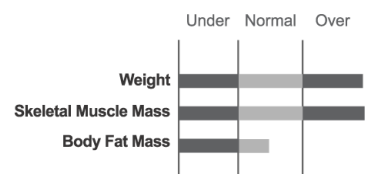


Here we have a D shape but whilst the weight is below the normal range, the skeletal muscle mass is within normal, but body fat mass is lower than normal.

However, body fat not only has an energy-storing function in our body but also assists the absorption of fat soluble vitamins, and maintains healthy skin and hair. In addition, it is an essential building block for cell membranes. Therefore this person needs to be careful not to lose more body fat.



Athletes are usually included in the overweight muscle type. As such, such people can easily be included in the obese category when BMI alone is used. This person does not need to undertake weight control measures.



Obesity Diagnosis

InBody720's obesity diagnosis uses BMI (Body Mass Index) and PBF (Percent Body Fat) to determine obesity levels.

Obesity Diagnosis

	Under	Normal	Over	Normal Range
B M I Body Mass Index (kg/m ²)	10 15 18.5 21.5 25 30 35 40 45 50 55	26.1		18.5 ~ 25.0
P B F Percent Body Fat (%)	8 13 18 23 28 33 38 43 48 53 58	33.0		18.0 ~ 28.0
W H R Waist-Hip Ratio	0.65 0.70 0.75 0.80 0.85 0.90 0.95 1.00 1.05 1.10 1.15	0.86		0.75 ~ 0.85

BMI (Body Mass Index, kg/m²)

The formula is $BMI = \text{Weight (kg)} / \text{Height}^2 \text{ (m}^2\text{)}$. BMI has been widely applied in the general medicine, dietary, and sports medicine fields as the main means of diagnosing obesity. However, this method is flawed in that it cannot be applied to adults with high levels of SMM, children, those over the age of 65, or pregnant females.

Also there can be occasions when weight is normal, but fat mass is too high and muscle mass is too low. BMI will not detect this as being a health issue.

Percent Body Fat (%)

Percent Body Fat indicates the percentage of body fat to body weight.

$$\text{Percent Body Fat (\%)} = \text{Body Fat Mass (kg)} / \text{Body Weight (kg)} \times 100$$

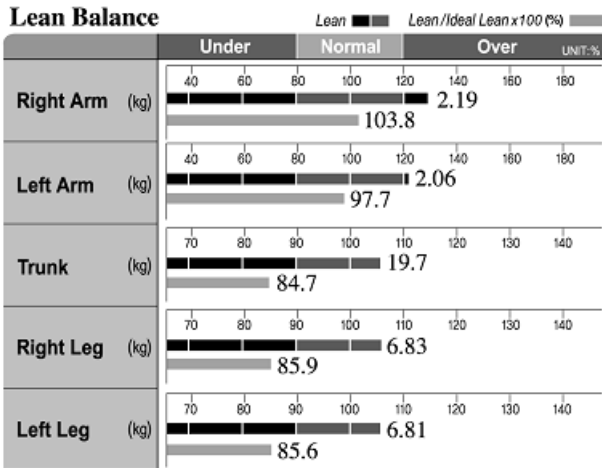
The standard range of Percent Body Fat for males is 10-20%, and 18-28% for females.

Waist-Hip Ratio

Waist-Hip ratio (WHR) is determined by dividing the waist circumference at the line of the navel by the maximum hip circumference. It is a useful indicator for looking at the distribution of body fat. InBody720 uses its impedance index to provide an estimation of the persons WHR. Males and Females found to have 0.95 and 0.90 respectively in WHR are considered to suffer from abdominal obesity.

Adults who have abdominal obesity tend to have excessive visceral fat (increased fat stored around the abdominal organs internally) and this has been linked with an increase risk of developing cardiovascular disease, High Blood Pressure and Diabetes in later life. This storage of visceral fat can be reversed by exercise and the levels reduced, so it is well worth promoting exercise for the long term health benefits in later life.

Lean Balance



InBody720 measures the soft lean mass of the body segments.

There are two bar graphs for each body part in the Lean Balance graph. The two graphs have different meanings.

The number at the end of the upper bar graph is the amount in Kg of soft lean mass in each area.

If the upper bar graph reaches 100%, it means that the person has ideal soft lean mass for his or her **ideal weight**.

If the lower bar graph reaches 100%, it denotes the ideal soft lean mass for the person in relation to his or her **actual weight**. The number beside the lower bar graph shows that ratio as a percentage.

I.e. Illustration above shows 85.6% for the left leg at actual weight, but closer to 115% at their ideal weight.

Visceral Fat

Visceral fat is the fat potentially stored around your abdominal organs and a high visceral fat over a long period of time puts a person at a greater risk of developing Cardiovascular disease, type 2 Diabetes, High Lipids and Hypertension. It is related to high percentage body fat and high waist hip ratios.

Right Hand Summary Boxes –

Summarizes the left hand side measurements

Weight Control

The target weight set by the InBody720 is different from the ideal weight. This is because an ideal weight only considers the height, whereas target weight also takes into account soft lean mass and body fat mass.

The reality is that two people of the same height and weight who have different body compositions will have different target weights.

Weight Control

Target Weight	60.7 kg
Weight Control	+1.6 kg
Fat Control	-3.2 kg
Muscle Control	+4.8 kg
Fitness Score	72 Points

Fitness Score

Every body starts off at 80; you then lose points for too much fat or too little muscle, and gain points for more muscle. Used as a motivational scoring tool. As body composition changes with exercise, the fitness score should increase.

70 or less	Lacking muscle or overweight. Needs exercise and diet control.
70~80	Average person off the street , reasonably healthy
80 – 85	Those who actively look after their diet and exercise
85 +	Usually very fit or carrying a lot of muscle

Body Composition History

Shows the last measurements in an abbreviated format.

Body Composition History

DATE / TIME	Weight	SMM	Fat	Score
05/01/02 11:15	61.5	20.5	19.9	69
05/01/15 11:10	60.2	20.8	18.7	70
05/02/01 11:23	59.1	22.3	17.1	72

Additional Data

Obesity Degree

Obesity Degree is the percentage above or below ideal weight. Normal range allows for 10% above or below –ie 90-110%. Therefore this person is 3% under ideal weight.

BCM (Body Cell Mass)

Body Cell Mass is the amount of cells in the body.

Screening tool to monitor reduction in muscle mass due to muscle wasting process secondary to disease or poor nutrition.

BMC (Bone Mineral Content)

Screening tool to monitor bone mineral. Linked to Osteoporosis – especially relevant to women reaching the menopause. Weight bearing exercise and weight lifting exercise has been shown to improve bone mineral. Those people with high skeletal muscle mass have higher bone mineral. BMC has been validated by DEXA

BMR (Basal Metabolic Rate)

Basal Metabolic Rate (BMR) is the minimum amount of energy required to sustain vital functions whilst at rest.

InBody uses a formula based on fat free mass rather than just height and weight. This is more accurate and reflects the effect of gaining muscle mass and the resultant increase in BMR when people take up more exercise.

AC (Arm circumference)

Estimation of the circumference of the upper part of the left arm.

AMC (Arm muscle circumference)

Estimation of the circumference of the upper muscle of the left arm. The soft lean mass of the upper arm is the fastest reflection of an individual's nutritional status and also tells us about where people store fat under the skin as subcutaneous fat

Additional Data

	(Normal Range)
Obesity Degree = 97%	90 ~ 110
B C M = 26.7 kg	27.5 ~ 33.5
B M C = 2.56 kg	2.36 ~ 2.88
B M R = 1276 kcal	1186 ~ 1367
A C = 25.5 cm	
A M C = 21.6 cm	