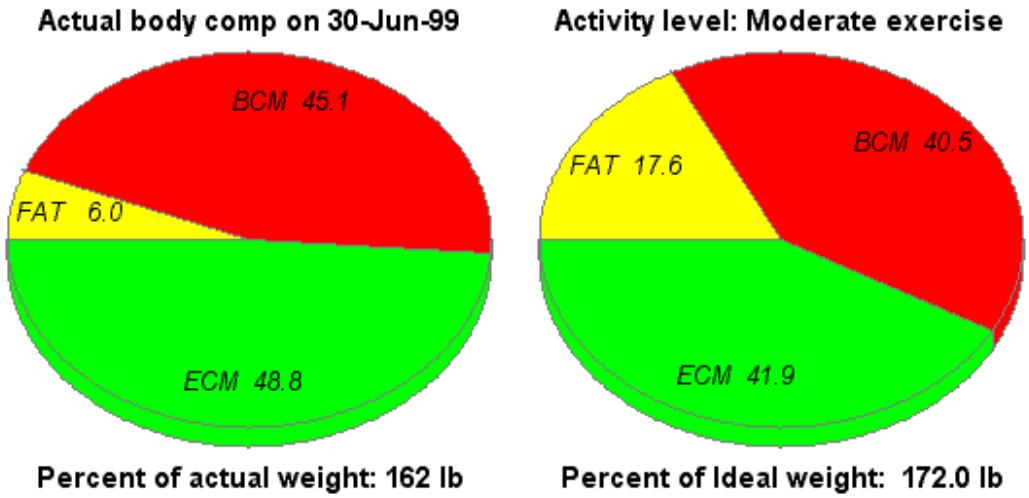
Body Composition Report created by

The Guardian Health Association. Please have these results intepreted by a qualified health care professional.

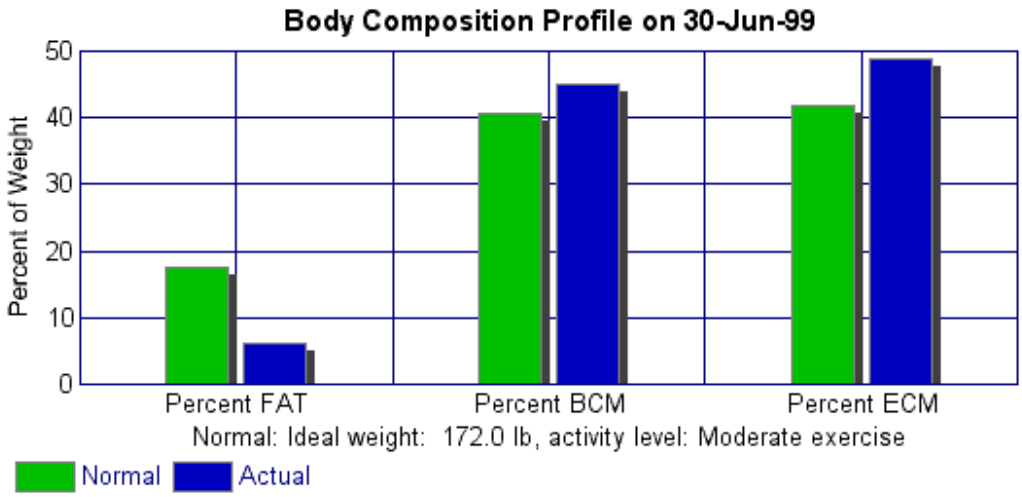
BIA Results:	Male	Name:	Sample Subject
Height in:	71	Date:	Monday, August 30, 2004 9:24:00 AM
Weight lb:	162	Database:	C:/Program Files/RJL Systems/Cyprus/BodyComp/samplesubjects.db
Age:	40	Subject ID:	SSS
Ideal weight:	172.0 lb	Record date:	30-Jun-99
BMI:	22.59	Template:	FNA_style.tmpl
Phase angle:	6.8	BIA tests:	4, template tables: 1
Resistance:	388	Reactance:	46 ohms
Equation Set:	NHANES-III		

Body Composition compartments (percent) compared to normal



Description	Actual	Norm.	Diff.	Normal Range	Comment
FAT % of Wt.	6.0	17.6	-11.6	Min: 15.1 Max: 20.1 %	FAT less than min by 9.1 percent
BCM % of Wt.	45.1	40.5	4.6	Min: 37.0 Max: 43.9 %	BCM exceeded max by 1.2 percent
ECM % of Wt.	48.8	41.9	6.9	Min: 38.5 Max: 45.4 %	ECM exceeded max by 3.4 percent
FFM % of Wt.	94.0	82.4	11.6	Min: 79.9 Max: 84.9 %	FFM exceeded max by 9.1 percent

Body Composition compartments (percent) compared to normal



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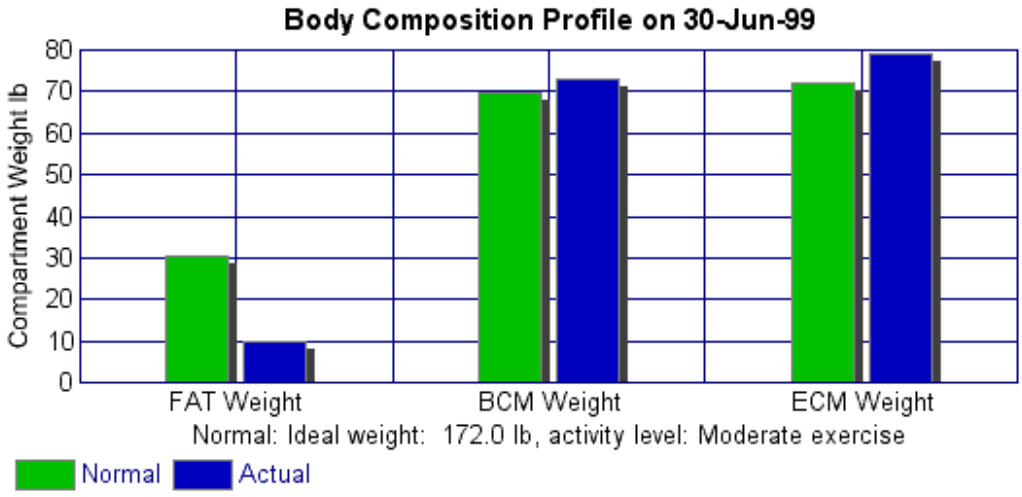
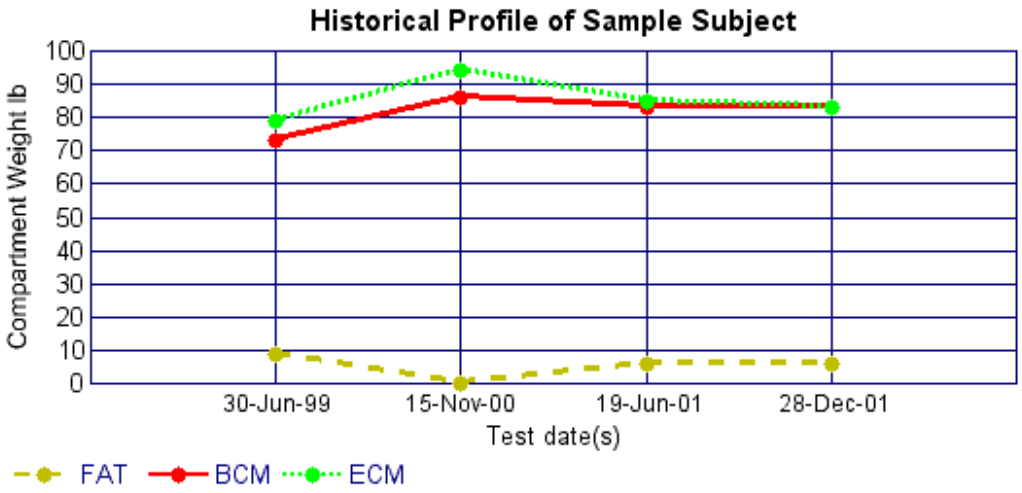
Body Composition compartments (weight) compared to normal

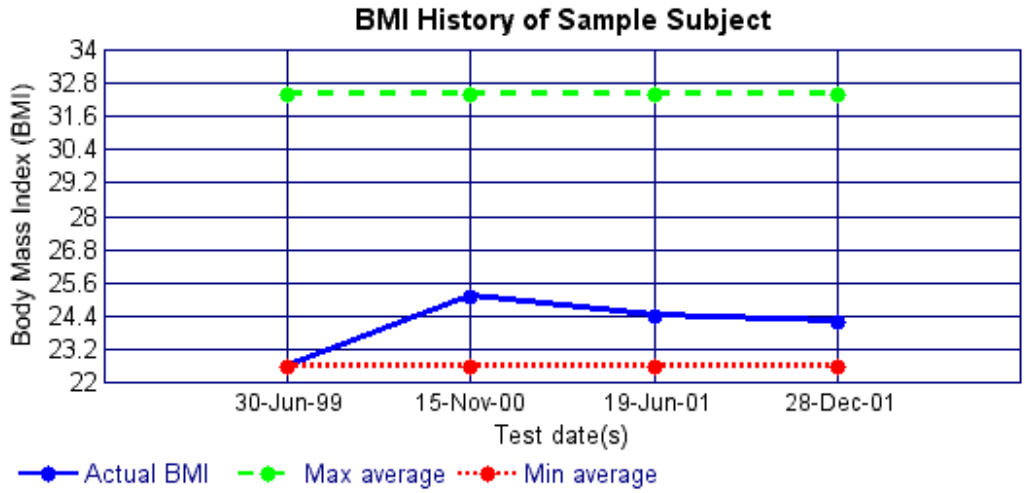


Description	Actual	Norm.	Diff.	Normal Range	Comment
FAT Pounds	9.8	30.3	-20.5	Min: 26.0 Max: 34.6 lb	FAT less than min by 16.2 Pounds
BCM Pounds	73.1	69.6	3.5	Min: 63.7 Max: 75.6 lb	BCM within normal by 3.4 Pounds
ECM Pounds	79.1	72.1	7.0	Min: 66.1 Max: 78.0 lb	ECM exceeded max by 1.1 Pounds
FFM Pounds	152.2	141.7	10.5	Min: 137.4 Max: 146.0 lb	FFM exceeded max by 6.2 Pounds

Body composition compartment history



Body Mass Index (BMI)



BMI results of Sample Subject

Description	Actual	Norm.	Diff.	Normal Range	Comment
30-Jun-99	22.59	27.49	4.90	Min: 22.56 Max: 32.42 (index)	BMI within normal by 4.9 (index)
15-Nov-00	25.10	27.49	2.39	Min: 22.56 Max: 32.42 (index)	BMI within normal by 2.4 (index)
19-Jun-01	24.41	27.49	3.08	Min: 22.56 Max: 32.42 (index)	BMI within normal by 3.1 (index)
28-Dec-01	24.20	27.49	3.29	Min: 22.56 Max: 32.42 (index)	BMI within normal by 3.3 (index)

BMI Risk Table

BMI Category	Health risk based solely on BMI	Risk adjusted for the presence of comorbid conditions and/or risk factors

19-24	Minimal	Low
25-26	Low	Moderate
27-29	Moderate	High
30-34	High	Very High
35-39	Very High	Extremely High
40+	Extremely High	Extremely High

What is BMI ?

BMI stands for "Body Mass Index," a ratio between weight and height. It is a mathematical formula that correlates somewhat with body fat.

Why is BMI Important ?

If your BMI is high, you may have an increased risk of developing certain diseases, including:

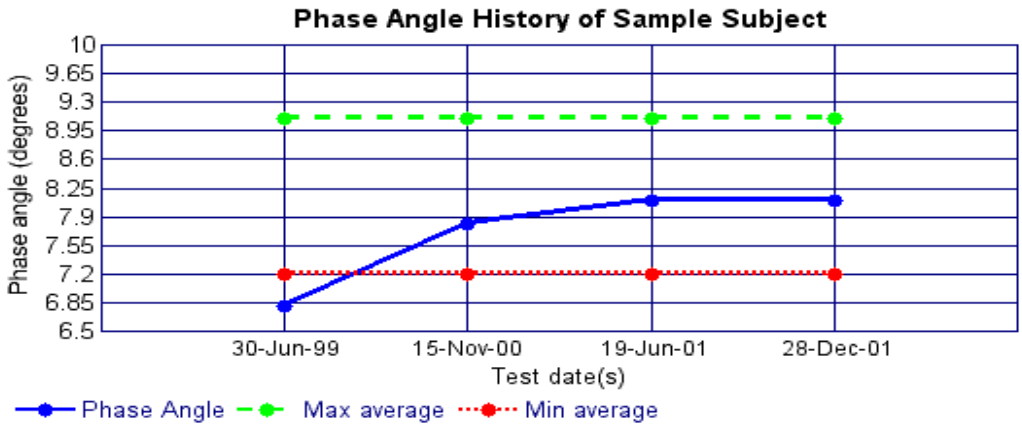
1. Hypertension
2. Cardiovascular Disease
3. Dyslipidemia
4. Adult-Onset Diabetes (Type II)
5. Sleep Apnea
6. Osteoarthritis
7. Female Infertility

Prevention of further weight gain is important and weight reduction is desirable.

Exceptions to BMI

BMI is a better predictor of disease risk than body weight alone. However, there are certain people who should not use BMI as the basis for estimating body fat content: competitive athletes and body builders, whose BMI is high due to a relatively larger amount of muscle, and women who are pregnant or lactating. Nor is it intended for use in growing children or in frail and sedentary elderly individuals.

Phase Angle



Phase angle results of Sample Subject

Description	Actual	Norm.	Diff.	Normal Range	Comment
30-Jun-99	6.8	8.2	-1.4	Min: 7.2 Max: 9.1 (deg.)	PA less than min by 0.4 (degrees)
15-Nov-00	7.8	8.2	-0.3	Min: 7.2 Max: 9.1 (deg.)	PA within normal by 0.4 (degrees)
19-Jun-01	8.1	8.2	-0.1	Min: 7.2 Max: 9.1 (deg.)	PA within normal by 0.1 (degrees)
28-Dec-01	8.1	8.2	-0.1	Min: 7.2 Max: 9.1 (deg.)	PA within normal by 0.1 (degrees)

Phase angle risk table for males

Phase Angle (degrees)	Health risk based on Phase Angle
Above 10.4	Extremely healthy
8.5 10.3	Optimal health
7.2 8.4	Average
5.9 7.1	Below average
4.7 5.8	Low energy
Below 4.6	Warning - alert

What is Phase Angle ?

Phase angle is based on total body resistance and reactance and is independent of height, weight and body fat. Lower phase angles appear to be consistent with either cell death or a breakdown of the cell membrane. Higher phase angles appear to be consistent large quantities of intact cell membranes and body cell mass. All living substances have a phase angle, in fresh uncooked vegetables phase angle can exceed 45 degrees. In cooked vegetables phase angle is zero because they are dead.

Why is Phase Angle Important ?

Phase Angle is a predictor of outcome and indicates the course of disease or increases as the result of optimal health based on good nutrition and consistent exercise.

As we get older our phase angle will decrease and will be approximately 4 or less when we die. Fit adolescents may have a phase angle greater than 10. This effect is a result of cell integrity due to age. Low phase angles are consistent with:

1. Malnutrition
2. HIV/AIDS infection
3. Cancer (most types)
4. Abusive life style
5. Chronic Alcoholism
6. Old Age (80 - 100 years)

Good fitness and life style is the key to maintaining a healthy phase angle.

Phase Angle Conclusion

Phase angle is good indicator of disease progression although it is not used to diagnose a specific disease. It may be thought of as a thermometer with a broad range of normal. It may also be used to monitor the practice of good health, which would include healthy diets, the use nutritional supplements and exercise.

References:

M. Ott, H. Fisher, H. Polat, E. B. Helm, M. Frenz, W. F. Caspary B. Lembcke *"Bioelectrical Impedance Analysis as a Predictor of Survival in Patient with HIV Infection"* J. of Acquired Immune Deficiency Syndromes and Human Retrovirology 9:20-25 1995

R. Liedtke *"Principles of Bioelectrical Impedance"* http://rjlsystems.com

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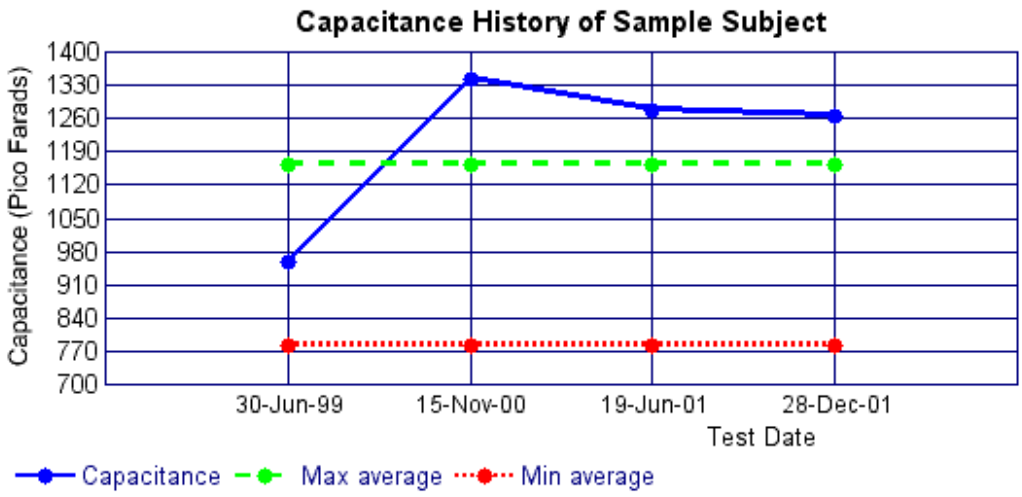
Parallel Capacitance (pico farads)



Parallel capacitance results of Sample Subject

Description	Actual	Norm.	Diff.	Normal Range	Comment
30-Jun-99	959	972	-13	Min: 781 Max: 1162 (PF)	CAP within normal by 12.5 (pico farads)
15-Nov-00	1342	972	370	Min: 781 Max: 1162 (PF)	CAP exceeded max by 180.0 (pico farads)
19-Jun-01	1277	972	304	Min: 781 Max: 1162 (PF)	CAP exceeded max by 115.0 (pico farads)
28-Dec-01	1266	972	293	Min: 781 Max: 1162 (PF)	CAP exceeded max by 104.0 (pico farads)

Parallel capacitance cell health table for males

Capacitance (pico Farads)	Cell health based on parallel capacitance
Above 1313	Extremely healthy
1003-1312	Optimal health
795-1002	Average
589-794	Below average
382-588	Low energy
Below 381	Warning - alert

What is parallel capacitance

All living things are made of cells. Cells are membrane bounded compartments filled with a concentrated solution of chemicals and salts. Groups of cells perform specialized functions and are linked by an intricate communications system. The cell membrane maintains an ion concentration gradient between the intracellular and extracellular spaces. This gradient creates an electrical potential difference across the membrane which is essential to cell survival. Electrical gradients are necessary to support movement of oxygen, carbon dioxide, and nutrients. Therefore, the cell membrane has electrically insulating qualities or capacitance.

Electrical capacitance will increase or decrease depending on the health and the number of cells. Damage to the cell membrane, and its functions, is as lethal to the cell as direct damage to the nucleus itself. ";

Why is parallel capacitance important

The cell membrane functions as a permeable barrier separating the intracellular (cytoplasm) and extracellular components. The lipid membrane is transversed by proteins, which are soluble in water thus making pores through which water, ions and other chemicals can enter and exit the cell.

BIA prediction equations have been developed that use parallel resistance and reactance as predictors of extracellular mass and body cell mass. Comparisons to K40, DEXA and D20 were very good ($r > .9$) and are sufficient to be used in clinical practice and studies of wasting disorders in AIDS patients.[1]

Conclusion to parallel capacitance

Parallel capacitance is somewhat like phase angle, whereas it is not effected by weight or body fat. It is a measure of cell membrane health in all living substances and can change dramatically depending on disease or good health.

A body builder, for example, would have a high parallel capacitance and low resistance, or more cell volume, because he is extremely muscular and fit. A malnourished AIDS patient would have a low parallel capacitance.

References:

[1] Donald P Kotler, S. Burastero, J. Wang, R. N. Pierson Jr. *"Prediction of body cell mass, fat-free mass, and total body water with bioelectrical impedance analysis: effects of race, sex, and disease"* Am. J. of Clinical Nutrition 64:3 Sep 1996.

R. Liedtke *"Fundamentals of Bioelectrical Impedance"* http://rjlsystems.com

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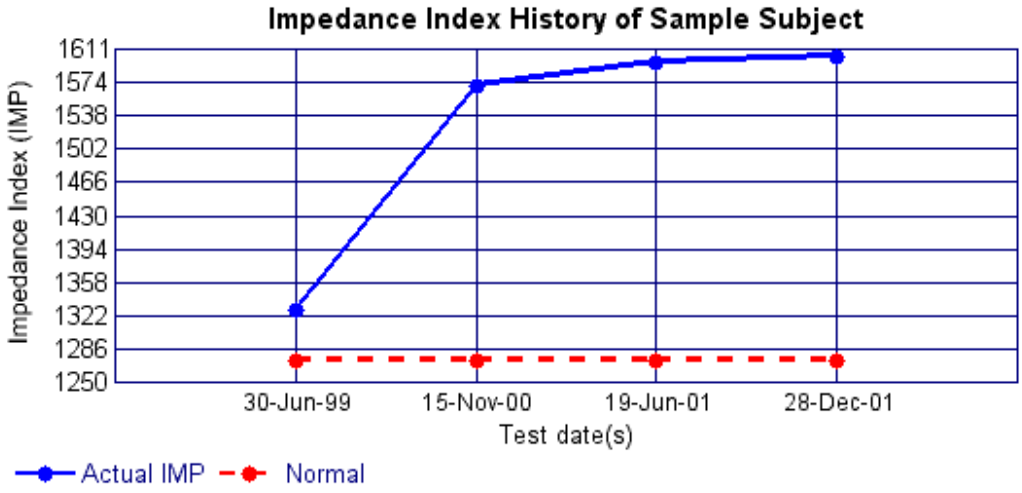
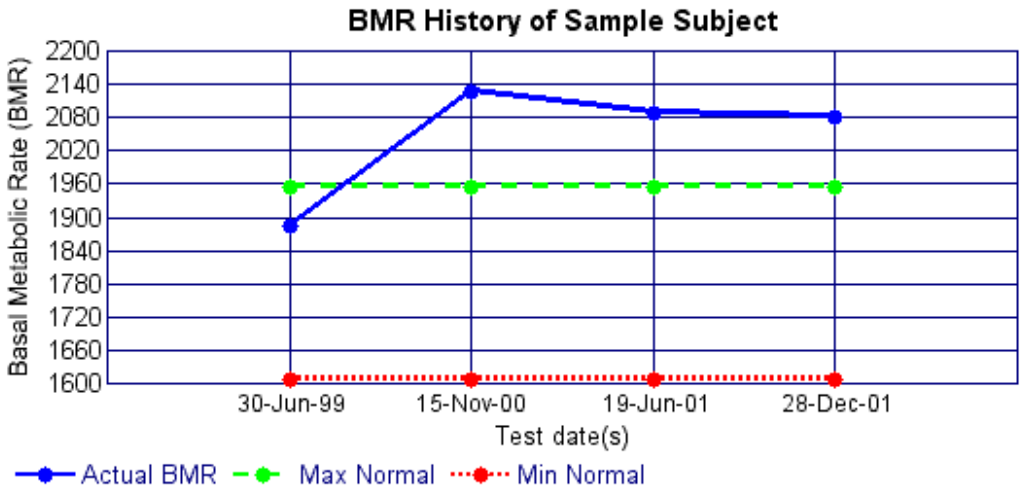
Impedance Index (IMP)



Impedance Index results of Sample Subject

Description	Actual	Norm.	Diff.	Normal Range	Comment
30-Jun-99	1328.8	1273.0	55.8	>= 1273.0 (index)	IMP greater than normal by 55.8 (index)
15-Nov-00	1571.4	1273.0	298.4	>= 1273.0 (index)	IMP greater than normal by 298.4 (index)
19-Jun-01	1596.1	1273.0	323.1	>= 1273.0 (index)	IMP greater than normal by 323.1 (index)
28-Dec-01	1602.4	1273.0	329.4	>= 1273.0 (index)	IMP greater than normal by 329.4 (index)

Basal Metabolic Rate (BMR) K Calories



Basal Metabolic Rate (BMR) results of Sample Subject

Description	Actual	Norm.	Diff.	Normal Range	Comment
30-Jun-99	1885	1781	104	Min: 1606 Max: 1955 (Kcal.)	BMR within normal by 104.5 (K calories)

15-Nov-00	2126	1781	344	Min: 1606 Max: 1955 (Kcal.)	BMR exceeded max by 171.0 (K calories)
19-Jun-01	2088	1781	307	Min: 1606 Max: 1955 (Kcal.)	BMR exceeded max by 133.0 (K calories)
28-Dec-01	2082	1781	301	Min: 1606 Max: 1955 (Kcal.)	BMR exceeded max by 127.0 (K calories)

BMR normal table for males

BMR range (K calories)	Energy level for males
Above 2124	Extreme energy
1809-2123	High energy
1597-1808	Average energy
1387-1596	Below average
1176-1386	Low energy
Below 1175	Warning - alert

What is BMR

Energy is the most fundamental need of biological systems. Without it, the basic biological processes of life cannot occur. Survival depends on consistently finding the right fuel in the appropriate quantity to sustain the biochemical reactions of energy metabolism. The body extracts and uses energy through the process of metabolism. Metabolism occurs in two distinct and interdependent phases: 1.) *catabolism*, in which the body breaks down food into its component parts and harvests the energy stored in its atomic bonds, and 2.) *anabolism*, in which those component parts and energy are used to build new tissues and conduct basic life functions. Basal Metabolic Rate (BMR) is the amount of energy your body requires every day to perform its most basic function including:

1. Breathing
2. Digesting
3. Heart beating
4. Muscle activity
5. Transportation of fluids and tissue
6. Circulation of blood

This is the amount of energy you would require if you laid in bed all day without ever moving a single muscle. Since most of us do a bit more than that, a daily activity level must also be factored in. This ranges from everyday activities to working out strenuously.

Why is BMR important

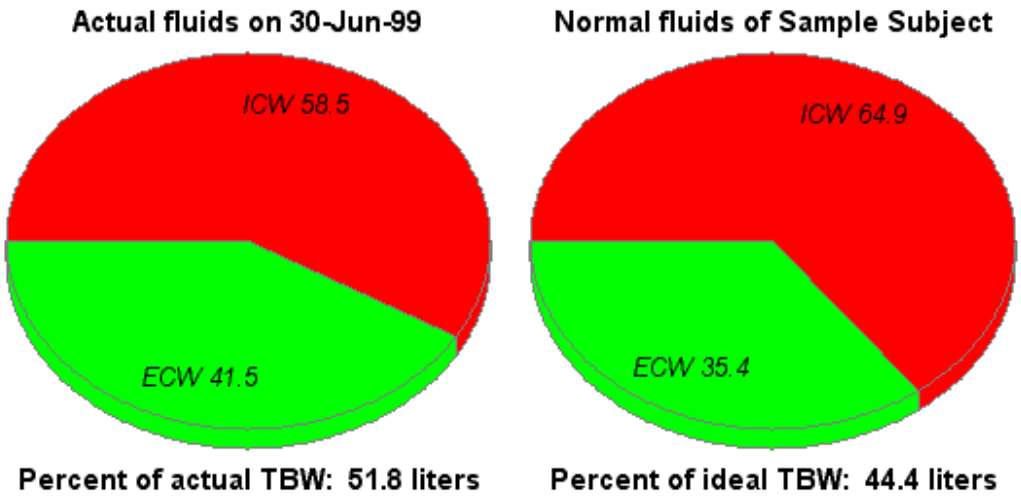
BMR is the only a way to estimate how fast you burn calories. The slower your metabolism, the more weight you will retain. If you burn your daily calorie intake, you will maintain your current weight. Burning more than your daily intake, causes weight loss. There are many factors that vary your metabolism. However, exercise and daily activity level are key to increasing your BMR. There can be major nutritional consequences to the decline of the BMR in advanced age. Decreased caloric requirements may lead to decreased food intake. Sufficiently low caloric intake can lead to deficient intake of essential nutrients.

Conclusion to basal metabolic rate

BMR varies between the sexes. Lean body mass is a major determinant, and women tend to have less lean muscle mass. As a result, their BMR is lower than that of otherwise comparable males. BMR is at peak during

infancy, then it declines rapidly through childhood and adolescence. It continues to fall slowly with increasing age and decline further with old age largely due to a loss of muscle mass. However, this is not inevitable, because weight-bearing (resistance) exercise will prevent or reverse muscle loss among the elderly.

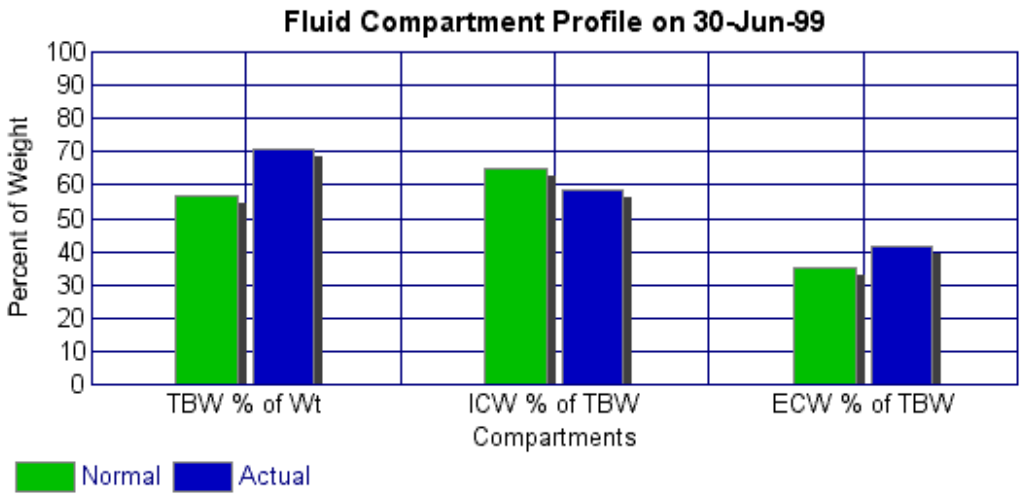
Total Body Water compartments (percent) compared to normal



Percent of actual TBW: 51.8 liters **Percent of ideal TBW: 44.4 liters**

Description	Actual	Norm.	Diff.	Normal Range	Comment
ICW % of TBW	58.4	64.8	-6.3	Min: 61.7 Max: 67.9 % (tbw)	ICW less than min by 3.3 percent
ECW % of TBW	41.6	35.2	6.3	Min: 32.1 Max: 38.3 % (tbw)	ECW exceeded max by 3.3 percent
TBW % of Wt.	70.5	57.0	13.5	Min: 53.9 Max: 60.0 % (wt)	TBW exceeded max by 10.5 percent

Total Body Water compartments (percent) compared to normal



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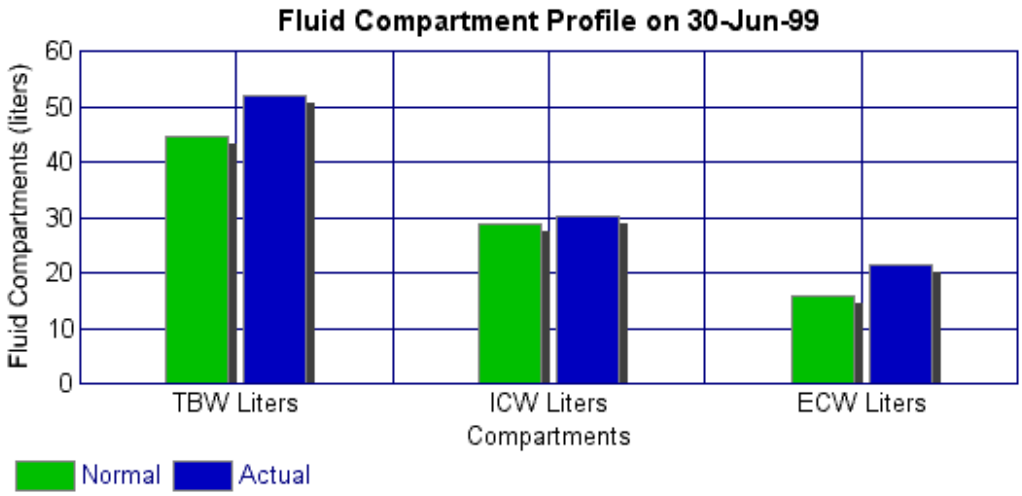
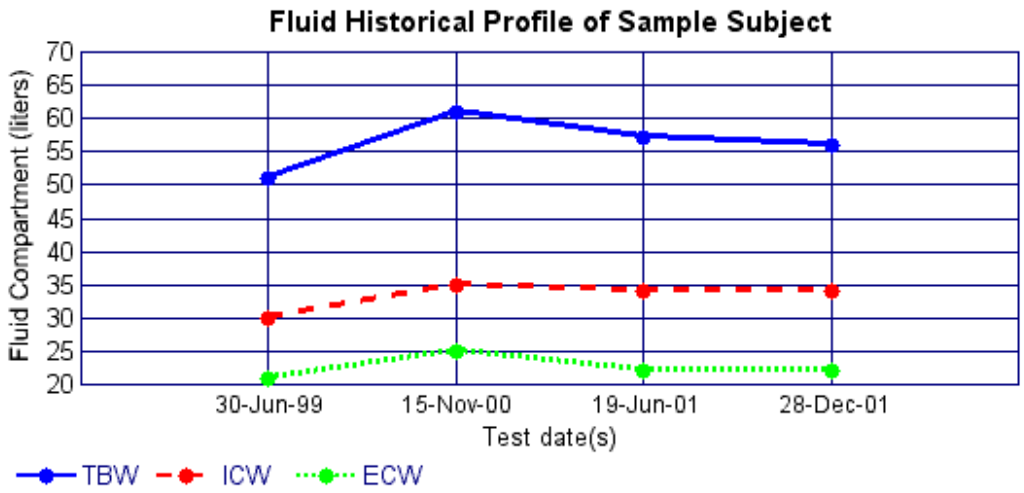
TBW % of Wt.	70.5	57.0	13.5	Min: 53.9 Max: 60.0 % (wt)	TBW exceeded max by 10.5 percent

Total Body Water compartments (liters) compared to normal



Description	Actual	Norm.	Diff.	Normal Range	Comment
ICW Liters	30.3	28.8	1.5	Min: 26.4 Max: 31.2 Liters	ICW within normal by 1.5 Liters
ECW Liters	21.5	15.7	5.9	Min: 13.2 Max: 18.1 Liters	ECW exceeded max by 3.4 Liters
TBW Liters	51.8	44.4	7.3	Min: 42.1 Max: 46.8 Liters	TBW exceeded max by 5.0 Liters

Total body water compartment history



Template FNA_style.tmpl table

Date:	30-Jun-99	15-Nov-00	19-Jun-01	28-Dec-01
Height:	71.00	71.00	71.00	71.00
Weight:	162.00	180.00	175.00	173.50
Age:	40	41	42	42
Resistance:	388.0	320.0	346.0	351.0
Reactance:	46.0	44.0	49.0	50.0
Ideal/desired wt:	172.00	172.00	172.00	172.00
Actual BMI:	22.59	25.10	24.41	24.20
Actual phase:	6.8	7.8	8.1	8.1
Actual BMR:	1885	2126	2088	2082
% actual FAT:	6.0	-0.2	3.5	3.9
Wt actual FAT:	9.8	-0.3	6.1	6.8
Wt actual BCM:	73.1	86.1	83.7	83.2
Wt minimum BCM:	63.7	63.7	63.7	63.7
Wt actual ECM:	79.1	94.2	85.2	83.5
Wt maximum ECM:	78.0	78.0	78.0	78.0
Liters actual TBW:	51.8	61.2	57.4	56.7
Liters actual ICW:	30.3	35.6	34.6	34.4
Liters actual ECW:	21.5	25.6	22.8	22.2

Why is Body Composition Important ?

Scale weight is not an indicator of an individual's body fat or health. Body composition is the amount of lean tissue compared to fat. Body composition data can form the basis for a wide variety of therapeutic health and fitness prescriptions. In clinical applications, body composition analysis along with nonpharmacologic nutrition and exercise prescriptions provide the foundation upon which further treatment is based. Only body composition analysis can determine how much muscle and fat are lost or gained as the result of any nutrition, exercise, or pharmaceutical prescription.

How is Abnormal Body Composition Managed ?

When there is an imbalance between calorie intake and calorie burn, we change our body composition. The quantitative management of abnormal body composition, i.e. obesity, anorexia, disease, etc. must be associated with daily calorie intake and expenditure. The successful application of body composition analysis must have a three compartment assessment. These compartments are:

1. FAT - Storage of potential energy or body fat or calorie storage.
2. BCM - (Body Cell Mass) The burning of fat and nutrients then converting it to work or kinetic energy or calorie expenditure.
3. ECM - (Extracellular Mass) The transportation of nutrients, waste and fluids.

Cyprus body composition analysis allow you to manage three compartment information and interact with the data to create and evaluate custom prescriptions for change.

What are the Long-Term Benefits of a Good Body Composition Prescription ?

The ability to (1) analyze body composition data interactively, (2) create prescriptions for change and (3) visualize the effectiveness of those prescriptions with projected and historical graphs helps increase motivation for positive change.

The ultimate outcome is improved health and increased longevity!

The Three Compartments of the Human Body

The functional compartment, Body Cell Mass

Body Cell Mass is the functional mass of the body where work is done. All oxygen consumption, carbon dioxide production, glucose oxidation, protein synthesis and other metabolic work takes place within the body cell mass. The body cell mass is, in effect, the total mass of all the cellular elements in the body, and therefore, represents the metabolically active component of the body. In the normally nourished individual, muscle tissue accounts for approximately 60% of the body cell mass, organ tissue for 20% of body cell mass, with the remaining 20% made up of red cells and tissue cells. It also contains the majority of the body's potassium, (98 - 99%).

The support compartment, Extracellular Cell Mass

Extracellular Cell Mass is the support mass of the body and is metabolically inactive, consumes no oxygen, produces no carbon dioxide and performs no work. The extracellular mass consists of extracellular fluids and solids, such as bone and cartilage, with its primary function that of support and transport. ECM is located outside of the cellular compartment or outside of the body cell mass. **Lean body mass is the sum of body cell mass and extracellular mass**.

The energy storage compartment, Fat Mass

Fat Mass Body fat is the storage of potential energy that you consume when doing work or exercise. Fat has 3500 calories per pound of body fat. It is the total lipid mass (triglycerides) with a density of .9 g/ml. **Fat is equal to actual weight minus fat free mass**

A note on good health

Eating is one of life's greatest pleasures

Food choices depend on history, culture, and environment, as well as on energy and nutritional needs. People also eat foods for enjoyment. Family, friends, and beliefs play a major role in the ways people select foods and plan meals.

Diet is important to health at all stages of life

Many genetic, environmental, behavioral, and cultural factors can affect health. Understanding family history of disease or risk factors -- body weight and fat distribution (body composition), blood pressure, and blood cholesterol, for example -- can help people make more informed decisions about actions to improve health. Food choices are among the most pleasurable and effective of these actions.

Healthful diets help children grow, develop, and do well in school. They enable young and older adults to work productively and feel their best. Food choices also can help to prevent chronic diseases, such as heart disease, certain cancers, diabetes, stroke, and osteoporosis, that are leading causes of death and disability among Americans. Good diets can reduce major risk factors for chronic diseases -- factors such as obesity, high blood pressure, and high blood cholesterol.

Foods contain energy, nutrients, and other components that affect health

People require energy and certain other essential nutrients. These nutrients are essential because the body cannot make them and must obtain them from food. Essential nutrients include vitamins, minerals, certain amino acids, and certain fatty acids. Foods also contain fiber and other components that are important for health. Although each of these food components has a specific function in the body, all of them together are required for overall health. People need calcium to make bones, for example, but many other nutrients also take part in building and maintaining bones.

The carbohydrates, fats, and proteins in food supply energy which is measured in calories. Carbohydrates and proteins provide 4 calories per gram. Fat contributes more than twice as much -- 9 calories per gram. Alcohol is also high in energy and supplies 7 calories per gram. Foods that are high in fat are also high in calories.

Physical activity fosters a healthful diet

Energy needs vary by age. Older adults, for example, need less food than younger and more active individuals. People who are inactive or trying to lose weight may eat little food and have difficulty meeting their nutrient needs in a satisfying diet. Nearly all people need to be more active, because a sedentary lifestyle is unhealthy. Increasing the energy spent in daily activities helps to maintain health and allows people to eat a nutritious and enjoyable diet.