

Nutritional Guidelines In Multiple Sclerosis



The Traditional Healthy Diet Pyramid

DAILY BEVERAGE RECOMMENDATIONS

6 glasses of water
Alcohol in moderation



FATS, OILS, SWEETS

Use sparingly

DAIRY PRODUCTS

2-3 servings daily



MEAT, FISH, EGGS, POULTRY, NUTS, BEANS

2-3 servings daily



VEGETABLES

3-5 servings daily



FRUITS

2-4 servings daily



BREAD, CEREAL, RICE, PASTA

6-11 servings daily



DAILY PHYSICAL ACTIVITY



Reference: US Department of Agriculture
www.usda.gov/scs/cnpp.hotmail.htm



Introduction

Multiple Sclerosis (MS) is a chronic disease that attacks the Central Nervous System (CNS), which is made up of the Brain, Spinal cord and Optic nerves. As yet there is no known cure for MS.

According to the World Health Organization ⁽¹⁾, chronic diseases are now the major cause of death and disability worldwide. Non-communicable conditions, including cardiovascular diseases, diabetes, obesity, cancer and respiratory illnesses now account for 59% of the 56.5 million deaths annually and 45.9% of the global burden of disease.

Research has shown that a change in dietary habits, physical activity and tobacco usage can have a major positive effect on reducing the rates of these chronic diseases, often in a relatively short time ⁽¹⁾.

Therefore it is important to understand what is meant by good nutritional health. Good nutritional health is characterized

by a well-developed body, ideal weight for body composition (ratio of muscle mass to fat), healthy skin, hair and mental alertness ⁽²⁾.

Through the decades, but more frequently in the past few years, many diets have been published in relation to MS, some advising improvement in well being, others claiming to boost the Immune System and even cure MS. Unfortunately much of this advice is not supported by research and proves to be very expensive to the individual.

The advice given within this booklet is based upon the guidelines of the "WHO Strategy for diet and Physical well-being", alongside evidence - based research, that has proven that it enhances the well being of the individual with MS. This brief overview will cover areas such as a healthy balanced diet, fats and fatty acids, vitamins and supplementation, physical exercise, tobacco and alcohol.

A Healthy Balanced Diet

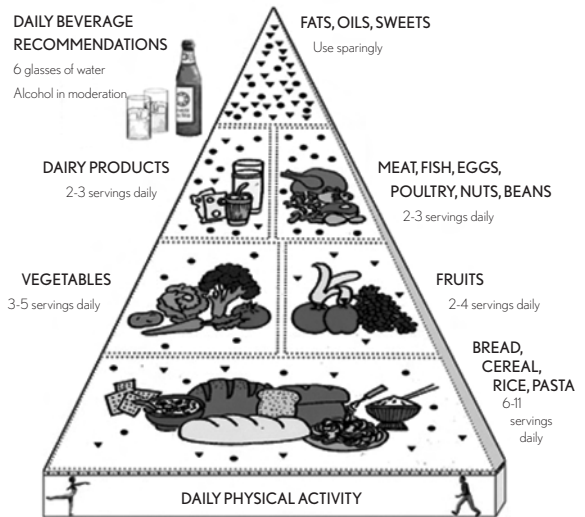
The World Health Organization (WHO) recommendations for a balanced diet include:

- Eating more fruit and vegetables as well as nuts and whole grains.
- Moving from saturated animal fats to unsaturated vegetable oil based fats.
- Reducing the amount of fatty, salty and sugary foods in the diet.

A general guide to the advised daily intake is best shown through the traditional diet pyramid.

Water and decaffeinated drinks are advised to be the first choice. Caffeine acts as a diuretic and is rich in drinks such as Coffee, tea, cola and other soft drinks. Some individuals with MS have been found to be sensitive to their hydration status and heat sensitivity, therefore they are encouraged to drink plenty of fluids, preferably water, due to the irritation caffeine may cause on the bladder.

Fig 1: A Healthy Balanced Diet



Reference: US Department of Agriculture
www.usda.gov/scs/cnpp.hotmail.htm



Fats and Fatty Acid

According to the American Heart Association guidelines ⁽³⁾, individuals, including those with MS, should follow the guidelines below for their total fat intake on a daily basis.

- 30% of total calories should come from fat
- 7 - 10% Saturated fat sources (butter,

cheese, whole milk, ice-cream, fatty meats, coconut and palm oils).

- 10% polyunsaturated fat sources (seeds, nuts, avocado, lean meat, eggs, legumes, oily fish, seafood, sunflower, corn or soybean oils).
- 10% Monounsaturated fat sources (Olive and Canola oils).

Omega 3 and Omega 6

Approximately 1/3 of nervous tissue consists of polyunsaturated fatty acids (PUFA). These are described as Linoleic acid - or Omega 6 and alpha-linolenic acid - or Omega 3. In research studies carried out in the past it has been shown that people with MS may benefit from increasing the intake of these fatty acids, which are often found to be in low levels in individuals with MS. The importance of these fatty acids is their Immunosuppressive (Omega 6) and Anti-Inflammatory (Omega 3) properties. Below is a table explaining which foods are rich in these properties.

Fig 2: Omega 3 and 6 - Polyunsaturated fatty acids

OMEGA 6

Linolenic Acid

Dietary sources: sunflower, sesame, safflower oils, seeds, nuts, lean meat, eggs.



Gamma-linolenic Acid

Dietary sources: evening primrose oil, borage oil.



Arachidonic acid (AA)

Dietary sources: liver, kidney, lean meat, eggs.



Prostaglandin E2

(Immunosuppressive)

OMEGA 3

Alpha-linolenic Acid

Dietary sources: green leafy vegetables, legumes, soybean oil.



Eicosapentaenoic Acid (EPA)

Dietary sources: fish, seafood, cod liver oil, fish oil.



Docosahexaenoic Acid (DHA)

Dietary sources: fish, seafood, liver, eggs, cod liver oil, fish oil.



Prostaglandin E3

(Anti-inflammatory)





Vitamins and Supplements

Vitamins are organic compounds that our bodies use, in very small amounts, for a variety of metabolic processes. Taking vitamins 'just in case' is not advocated by health experts. It is best to get vitamins naturally by eating a varied diet. Taking vitamin and mineral supplements instead of eating a nutritious diet is not recommended.

A varied diet generally provides enough of each vitamin and mineral.

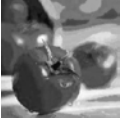
Research indicates that most of the vitamins you get from the food you eat are better than those contained in pills. Even though the vitamins in supplements are synthesized to the exact chemical composition of naturally occurring vitamins, they still don't seem to work as

well. The main exception to this is folate.

The synthetic form (in a supplement or fortified food) is actually better absorbed by the body than folate from food sources.

If vitamin supplementation is required then a basic multi-vitamin is suggested as opposed to expensive variations manufactured and advertised to help MS.

The special preparations often contain "add ins" that are unproven and come with unproven and excessive claims that only add to the cost.



Antioxidants

The process of oxidation in the human body damages cell membranes and other structures including cellular proteins, lipids and DNA. When oxygen is metabolized, it creates 'free radicals' which steal electrons from other molecules, causing damage. The body can cope with some free radicals and needs them to function effectively. However, an overload of free radicals has been linked to certain diseases. Antioxidants are found naturally in certain foods that neutralize free radicals. These include the nutrient antioxidants, vitamins A, C and E, and the minerals copper, zinc and selenium. Other dietary food compounds, such as the phytochemicals in plants and zoochemicals from animal products, are believed to have greater

antioxidant effects than either vitamins or minerals. These are called the non-nutrient antioxidants and include phytochemicals, such as lycopenes in tomatoes, and anthocyanins found in cranberries.

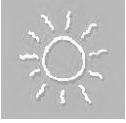
There is no evidence of their beneficial use in MS but neither is there likely to be any deleterious effects when used appropriately

Sources of Antioxidants

Good sources of antioxidants include:

- **Allium sulphur compounds** - leeks, onions and garlic.
- **Anthocyanins** - eggplant, grapes and berries.
- **Beta-carotene** - pumpkin, mangoes, apricots, carrots, spinach and parsley.
- **Catechins** - red wine and tea.
- **Copper** - seafood, lean meat, milk and nuts.
- **Cryptoxanthins** - red capsicum, pumpkin and mangoes.
- **Flavonoids** - tea, green tea, citrus fruits, red wine, onion and apples.
- **Indoles** - cruciferous vegetables such as broccoli, cabbage and cauliflower.
- **Isoflavonoids** - soybeans, tofu, lentils, peas and milk.
- **Lignans** - sesame seeds, bran, whole grains and vegetables.
- **Lutein** - leafy greens like spinach, and corn.
- **Lycopene** - tomatoes, pink grapefruit and watermelon.
- **Manganese** - seafood, lean meat, milk and nuts.
- **Polyphenols** - thyme and oregano.
- **Selenium** - seafood, offal, lean meat and whole grains.
- **Vitamin C** - oranges, blackcurrants, kiwi fruit, mangoes, broccoli, spinach, capsicum and strawberries.
- **Vitamin E** - vegetable oils (such as wheat germ oil), avocados, nuts, seeds and whole grains.
- **Zinc** - seafood, lean meat, milk and nuts.
- **Zoochemicals** - red meat, offal and fish. Also derived from the plants animals eat.

The best way to gain antioxidants is by eating 2 -4 servings of fruits and 3-4 servings of vegetables each day. Antioxidants can stimulate the immune system. In MS **suppressing** the immune system is advised, therefore antioxidant supplements are not advised and should only be used in moderation ⁽⁴⁾. Herbs, which may **stimulate** the immune system, and may be toxic if too much is taken, include Arnica, Echinacea, Ginseng, Garlic, Cats Claw and Liquorice!



Vitamin D

Vitamin D is a fat-soluble vitamin that is found in food and can also be made in your body after exposure to ultraviolet (UV) rays from the sun. Sunshine is a significant source of vitamin D because UV rays from sunlight trigger vitamin D synthesis in the skin.

Research also suggests that vitamin D may help maintain a healthy immune system and help regulate cell growth and differentiation, the process that determines what a cell is to become, as well as reducing the risk of Osteoporosis.

Sun Exposure

Sun exposure is perhaps the most important source of vitamin D because exposure to natural sunlight provides most humans with their vitamin D requirement. UV rays from the sun trigger vitamin D synthesis in skin. The season, geographic latitude, time of day, cloud cover, smog, and use of sunscreen all affect UV ray exposure and vitamin D synthesis. Sunscreens with a sun protection factor (SPF) of 8 or greater will block UV rays that produce vitamin D, but it is still important to routinely use sunscreen to help prevent skin cancer and other negative consequences

of excessive sun exposure. An initial exposure to sunlight (10 -15 minutes) allows adequate time for Vitamin D synthesis and should be followed by application of a sunscreen with an SPF of at least 15 to protect the skin. Ten to fifteen minutes of sun exposure at least two times per week to the face, arms, hands, or back without sunscreen is usually sufficient to provide adequate vitamin D. It is very important for individuals with limited sun exposure to include good sources of vitamin D in their diet ^(6,7).

Vitamin D Supplements and Food Sources

Daily recommendations for Vitamin D are 400 IU (10 µg) for adults these can be gained easily within the diet. Recent research suggests that patients with Multiple Sclerosis may benefit from increasing the daily recommended amount to 1000IU a day with the use of supplementation, such as Blackmores D3 1000IU (8). However it is important to note that Vitamin D is stored in the body and taking excessive amounts over a period of time can cause nausea, peptic ulcer disease, kidney stones and in more toxic amounts even death. Below is a table giving the servings found in food sources, which are cheaper and safer than the supplementations sold over the Internet from overseas in dangerously high doses. Recommendations for higher doses through supplementation should be considered once baseline levels are taken and in conjunction with Neurologist advice.

Fig 3: Selected Food Sources of Vitamin D

Food	International Units (IU) per serving	Percent DV*
Cod liver oil, 1 Tablespoon	1,360	340
Salmon, cooked, 3 1/2 ounces	360	90
Mackerel, cooked, 3 1/2 ounces	345	90
Tuna fish, canned in oil, 3 ounces	200	50
Sardines, canned in oil, drained, 1 3/4 ounces	250	70
Milk, nonfat, reduced fat, and whole, vitamin D fortified, 1 cup	98	25
Margarine, fortified, 1 Tablespoon	60	15
Pudding, prepared from mix and made with vitamin D fortified milk, 1/2 cup	50	10
Ready-to-eat cereals fortified with 10% of the DV for vitamin D, 3/4 cup to 1 cup servings (servings vary according to the brand)	40	10
Egg, 1 whole (vitamin D is found in egg yolk)	20	6
Liver, beef, cooked, 3 1/2 ounces	15	4
Cheese, Swiss, 1 ounce	12	4



Vitamin B12

Vitamin B12 is also called cobalamin because it contains the metal cobalt. This vitamin helps maintain healthy nerve cells and red blood cells. Vitamin B12 is naturally found in animal foods including fish, meat, poultry, eggs, milk, and milk products.

Characteristic Signs, Symptoms, and Health Problems Associated with B12 Deficiency

- Include anemia, fatigue, weakness, constipation, loss of appetite, and weight loss
- Deficiency also can lead to neurological changes such as numbness and tingling in the hands and feet
- Additional symptoms of B12 deficiency are difficulty in maintaining balance, depression, confusion, dementia, poor memory, and soreness of the mouth or tongue

- Signs of vitamin B12 deficiency in infancy include failure to thrive, movement disorders, delayed development, and megaloblastic anemia

Many of these symptoms are very general and can result from a variety of medical conditions other than vitamin B12 deficiency, and some of these symptoms can be caused by MS itself. It is important to have a physician evaluate these symptoms so that appropriate medical care can be given ⁽⁵⁾.



Physical Exercise

Daily physical activity is advised, alongside a healthy well balanced diet, to maintain a normal body weight within the body mass index (BMI range of 18.5-24.9).

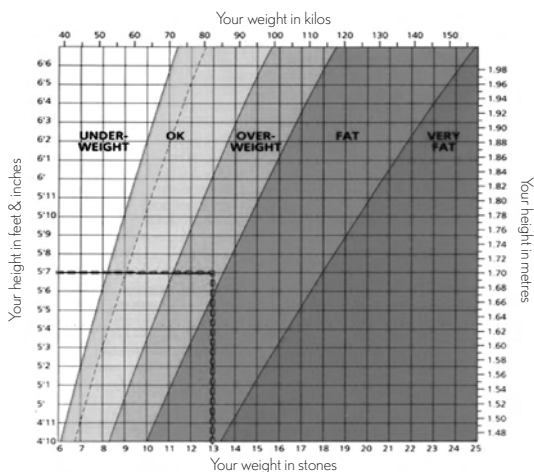
Exercise is thought to help people with MS control pain, stiffness, balance, weakness, depression, anxiety, insomnia and fatigue when done appropriately. Exercise is also seen as an essential component of health and well-being and should be seen as an enjoyment rather than a chore. Choose an exercise that is appropriate, convenient and affordable. Regardless of the type of exercise program, it is important to stay cool. This can be done by drinking cool fluids, using a fan and a spray bottle or wearing a cooling device.

Individuals who are commencing exercise for the first time should seek advice and information from their GP and local Physiotherapist.

Potentially beneficial complimentary therapies include activities such as massage, Tai Chi, hydrotherapy, yoga, meditation, Pilates, relaxation techniques and self-hypnosis/guided imagery.

Fig 4: Body Mass Index graph

(see inside back cover for colour illustration)



Reference: Food Standard Agency
www.food.gov.uk



Smoking & Alcohol

Smoking

In a paper published in May 2003

Cigarette smoking and the risk for MS, researchers studied the relationship between cigarette smoking and the risk for developing MS in 22,312 people between the ages of 40 and 47 living in Hordaland, Norway ⁽⁹⁾.

There were 87 people who reported having MS. All patients with MS who were current smokers, and most who had smoked in the past, had started smoking before they developed MS. Most people started smoking about 15 years before they developed MS. The research found that the risk for developing MS was nearly twice as high in people who currently smoked or had ever smoked than in nonsmokers. When men and women were evaluated separately, the risk for developing MS was nearly three times greater for men and one and a half times greater for women who smoked than in nonsmokers. Smoking also increased the risk for heart attacks, angina, and asthma for both men and women. A further study was reported in March 2005 and results from this study support the hypothesis that cigarette

smoking is associated with an increased risk of multiple sclerosis, and suggest that smoking may be a risk factor for transforming a relapsing-remitting clinical course into a secondary progressive course ⁽¹⁰⁾. These findings add even more weight to the advice to give up smoking.

Alcohol

There is nothing wrong with having the occasional tippie. Red wine, which is an antioxidant, is seen to be good in moderation, but drinking too much can cause problems.

Alcohol is high in calories and so can make you put on weight. It's also a diuretic, which means it makes the body lose more water than usual. So when you drink alcohol, it is essential to also have non-alcoholic drinks that aren't diuretics (i.e. non-caffeinated), otherwise it's easy to become dehydrated which can then lead to exacerbating symptoms experienced in MS.

Heavy drinking can lead to a wide range of health problems, including cancer; liver disease, stroke, high blood pressure and can adversely affect your mental health.

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Useful websites:

**Nutrition and Your Health: Dietary
Guidelines for Americans.**

5th ed. USDA Home and Garden Bulletin
No. 232, Washington, DC: USDA, 2000.
www.cnp.usda.gov/DietGd.pdf

The World Health Report 2003.

The global strategy on diet physical activity
and health.
www.who.int/entity/dietphysicalactivity/en

Vitamins and healthy eating.

www.goforyourlife.vic.gov.au

Office of Dietary Supplements NIH

Clinical Center National Institutes of Health
<http://ods.od.nih.gov/>

MS Society of Australia

www.msaustralia.org.au/

Multiple Sclerosis Trust publications list

<http://www.mstrust.org.uk>

**Multiple Sclerosis International
Federation**

www.msif.org/en/

Consortium of MS Centers (CMSC)

www.ms-care.org

National MS Society (USA)

www.nationalmssociety.org/WIG/home/

References

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- 2 Williams, SR (1995) basic nutritional diet therapy; New York; Mosby.
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- 5 Dietary Supplement Fact Sheet: Vitamin B12. Office of Dietary Supplements NIH Clinical Center National Institutes of Health <http://ods.od.nih.gov>
- 6 Dietary Supplement Fact Sheet: Vitamin D. Office of Dietary Supplements NIH Clinical Center National Institutes of Health <http://ods.od.nih.gov>
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- 9 Smoking is a risk factor for multiple sclerosis. Trond Riise, PhD, Monica W. Nortvedt, PhD and Alberto Ascherio, MD PhD. *NEUROLOGY* 2003;61:1122-1124. 2003 American Academy of Neurology
- 10 Cigarette smoking and the progression of multiple sclerosis. Hernan MA, Jick SS, Logroscino G, Olek MJ, Ascherio A, Jick H. *Brain*. 2005 Jun;128(Pt 6):1461-5. Epub 2005 Mar 9.

Figure 1: US Department of Agriculture
www.usda.gov/scs/cnpp@hotmail.htn

Figure 2: Allocca J.A Clinical Nutrition for the balanced body –2nd Edition. Chapter 12. Biochemical pathways. Allocca Biotechnology, Inc 2001. Northport New York. 1-18
Manley P. Diet in Multiple Sclerosis. *Diet and disease. The Practitioner*. May 1994 238:360 –363

Figure 3: Vit d -J P. Bowes and Church's Food Values of Portions Commonly Used. 17th ed. Philadelphia: Lippincot-Raven, 1998.

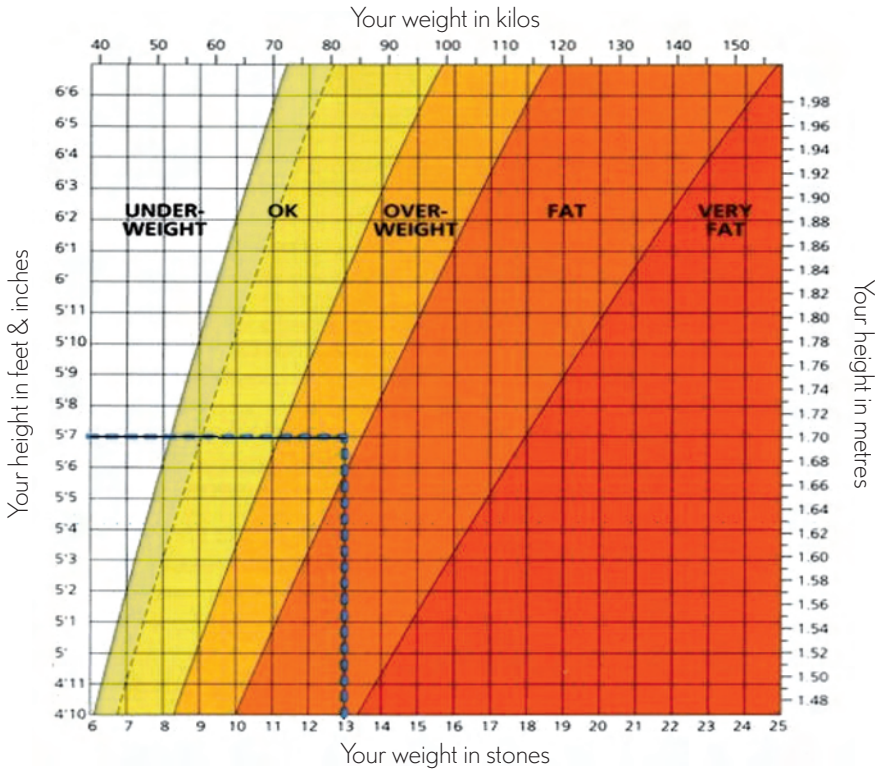
Figure 4: Food Standard Agency
www.food.gov.uk

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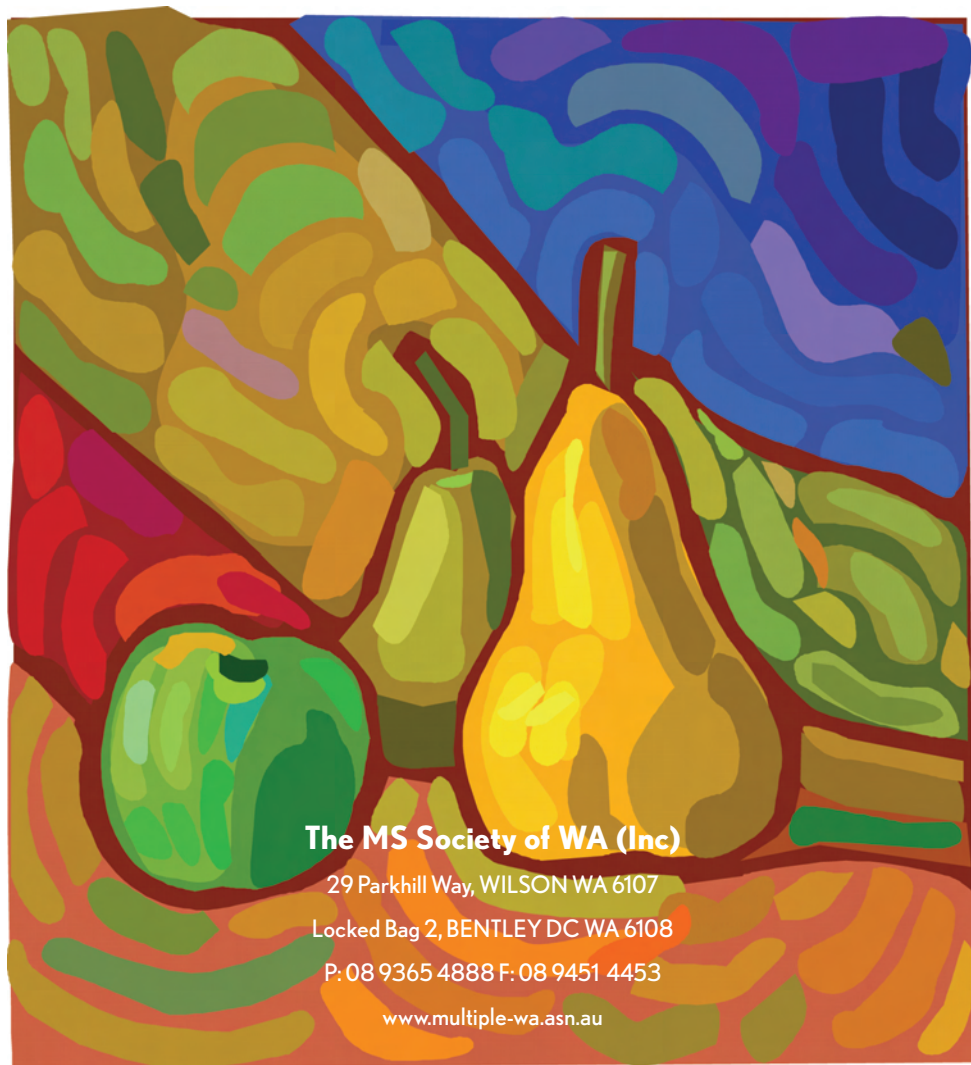
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Body Mass Index Graph



Reference: Food Standard Agency
www.food.gov.uk





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