

CHAPTER 4 - NUTRITION AND HEALTHY EATING

0401. **Introduction.** In accordance with the United Kingdom (UK) Ministry of Defence (MoD) policy and UK legislation it is incumbent on all catering staff to accommodate the diverse dietary needs of the military population, which is recruited from the multi-cultural population of the UK and the British Commonwealth. Additionally, caterers are required to respond to the requirements of prescribed diets, the particular nutritional requirements of military tasking and the increasing incidence of the impact of lifestyle choices on eating habit.

0402. **Nutrition Policy Statement.** The MoD Nutrition Policy Statement is detailed at Annex A. The Policy Statement commits all catering staff to provide a catering service based on sound nutritional principles reflecting current UK Government advice and initiatives and to support the rigorous physical fitness requirements of an expeditionary Armed Forces Policy.

0403. **Definition.** Nutrition is the science of food and the components of food that a living organism requires to maintain the processes of life. The complex chemical composition of the human body requires constant replenishment for the processes of energy production, tissue growth and repair and the bio-chemical functions of the human body.

0404. **Nutrition in the Armed Forces.** Nutrition is an integral part of the physical fitness regime of the Armed Forces and will form part of the preparation for operational duties to ensure optimum fitness for task. Baseline standards for operational effectiveness are defined in the knowledge that theatre specific modifications can be readily achieved. The MoD has developed UK Military Dietary Reference Values (MDRV)¹ for a range of macro- and micronutrients appropriate to the healthy end-user.

0405. **Balance.** Sound nutrition is essential for physical and mental performance and for maintaining health. Conversely, poor nutrition can lead to impairment in basic functions of the body such as breathing, heart activity, movement and temperature regulation, reduced cognitive skills, a predisposition to injury and ill-health and slower recovery from the impact of exercise, injury or illness.

0406. **Composition of Food.** In nutritional terms food, is composed of nutrients, water and fibre. Since 1926 the UK has had access to nutrient data based on the scientific analysis of raw and cooked foods. On behalf of the Department for the Environment, Food and Rural Affairs (DEFRA), the Food Standards Agency (FSA) maintain and add to this database by routinely updating the analyses. The nutrients are:

- a. Carbohydrate (CHO) – for energy.
- b. Fat – for energy, essential fatty acids, for tissue growth and the carriage of fat-soluble vitamins.
- c. Protein – for the growth and repair of tissue, the essential amino acids and for the production of hormones and enzymes.

¹ MDRV - available on the Defence intranet – DFS webpage.

- d. Vitamins – for the chemical processes of metabolism or as essential components of cell structures.
- e. Minerals – for physical structure and chemical balance in the human body.

Water and fibre are not classified as nutrients, but both are essential to the function of the human body. A large proportion of the body is made up of water and water is the medium in which many of the processes of the body occur. It requires constant replenishment. The role of fibre is more inexact, but it is required to maintain the muscle tone of the gut and it is known to have a beneficial effect on the levels of blood cholesterol. The specific functions of nutrients as part of a balanced diet are detailed at Annex B.

0407. **Energy.** The primary sources of energy are CHO and Fat. Protein in the form of amino acids not required for the production and maintenance of human tissue, hormones and enzymes is converted to CHO and fat and also utilised for energy. Alcohol, when metabolised also produces energy, but it is not a nutrient and it is strongly advised that the harmful effects of alcohol outweigh its value as an energy source.

Energy is required for all the functions of the body including the automatic muscular functions such as breathing, heart function, blinking etc, physical activity (work and leisure), and for the chemical processes such as brain activity, digestion and metabolism. As in all warm-blooded animals, a significant amount of energy is expended on maintaining the body temperature at a constant level. Energy is measured in calories (cal) or more commonly the kilocalorie abbreviated to Kcal or Cal or in mega joules (MJ). A Kcal is equivalent to 4.18 MJ. In round figures the energy value per gram of nutrients is as follows:

- a. CHO 4 Kcal.
- b. Fat 9 Kcal.
- c. Protein 4 Kcal.

The amount of energy required for the many functions of life varies between the genders and the amount of work the body is subjected to over and above the basal metabolic rate, which maintains the automatic bodily functions. The UK Government nutrition recommendations and advice are expressed as dietary reference values (DRV), which are designed to accommodate the variation in the general population. The national recommendations for the percentage contribution of each energy source to the total daily energy intake are:

CHO > 50% Fat < 35% Protein 15%

However, owing to the specific military need to develop and maintain muscle glycogen (CHO) stores for sustained physical work the military recommendation is that the principal nutrients provide dietary energy in the following ratio:

CHO 60% Fat 25 – 30% Protein 10 – 15%

The above recommendations do not indicate the volume of food to be consumed because of the difference between the Kcal values of the pure nutrients. Also the availability of nutrients obtainable

from food is affected by our ability to digest and absorb the nutrients from food. Neither does it indicate the preferred food sources. It is known that complex CHOs are more beneficial to human health in comparison to simple CHOs, as are fats that are described chemically as poly- or monounsaturated fats when compared to saturated fats.

0408. **Nutrition in a Balanced Diet.** It is a simple, but important fact, that no food has a nutritional value unless it is consumed, digested and absorbed. Digestion is the process that renders food absorbable. The choice of foods is dependent on several factors:

- a. Appearance.
- b. Smell.
- c. Availability.
- d. Legacy and familial eating habits.
- e. Advertisement.
- f. Cost.

The ability to digest food is mainly dependent on the health of the individual, their genetic make-up and the structure of the food. For example, cellulose – a complex CHO – is indigestible by humans, such that the nutrients within cells with cellulose outer membranes is unavailable except when the process of chewing (or cutting during food preparation) breaches the cell walls. The overarching recommendation is to consume a variety of foods from all the food groups.

0409. **The Food Groups.** For convenience the FSA have divided food into five groups that describe their common characteristics and potential value to nutrition.

- a. Meat, Fish, Eggs, Beans and other Non-dairy sources of Protein. These are a source of high quality proteins, vitamins and minerals.
- b. Bread, Rice, Potatoes, Pasta and other Starchy foods. These are the primary source of complex carbohydrates and some vitamins.
- c. Milk and Dairy foods. These contain high quality proteins, in addition to fat, vitamins and minerals. Milk is also a source of complex carbohydrates.
- d. Fruit and Vegetables. These are a primary source of vitamins minerals and fibre, which provides bulk to diet.
- e. Food and Drinks high in Fat and/or Sugar. These are primary energy sources, which may also contain essential fatty acids and fat-soluble vitamins.

The recommended proportions of the food groups in the daily diet is as follows:

- a. Meats, Fish, Eggs, Beans and other Non-dairy sources of Protein – 12%.

- b. Bread, Rice, Potatoes, Pasta and other Starchy foods – 33%.
- c. Milk and Dairy foods – 15%.
- d. Fruit and Vegetables – 33%.
- e. Food and Drinks high in Fat and/or Sugar – 8%.

0410. **Nutrition Related Illness.** There are a wide variety of medical conditions that are caused or exacerbated by food or specific nutrients because of an individual's inability to digest, absorb and or metabolise nutrients or their allergic response to food elements. The prevalent medical conditions are discussed in JSP 456 Vol 1 Chap 5.

0411. **Nutritional Value of Food.** The nutritional value of food depends on many factors not least the human body's ability to absorb and utilise the nutrients. Equally food processing and cooking have an impact either by improving the digestion of food or by damaging the nutrients. The deleterious effect of food processing and cooking on the nutrients is demonstrated in the table below.

Table 1. The Impact of Food Processing and Cooking on Indicator Nutrients

Nutrient	Heat	Light	Air	Water (leaching)	Acid	Alkali	Other
Protein	✓ if prolonged						
Vitamin A	✓ +air		✓ +heat				Metals
Thiamine (B1)			✓	✓		✓	Sulphur Dioxide
Riboflavin (B2)		✓		✓		✓	
Folate			✓	✓		✓	
Vitamin C	✓	✓	✓	✓		✓	Enzymes Metals
Minerals				✓			

PRINCIPLES OF HEALTHY EATING

0412. **The Philosophy of Healthy Eating.** Eating a variety of foods that give a good balance of nutrients is vital for the repair and maintenance of the body throughout life. The food we eat gives us the energy and nourishment to live and enjoy life. Current medical and scientific evidence suggests that dietary factors play a significant part in the development and prevention of many illnesses and diseases and the adoption of a healthy diet is in the national interest.

0413. **Eating Healthily.** Eating healthily does not mean individuals having to give up all or any type of food. No food is ‘bad’; it is how much, how often and in what combination it is eaten which influences the effect it has on the overall composition (healthiness) of the diet. The principle of healthy eating is to ensure that people have access to the necessary advice and information, the choice to eat appropriate combinations of foods, and the opportunity to modify dietary intake. The whole diet approach is crucial; dish-by-dish and day-by-day monitoring is not necessary. If the overall nutritional balance of the diet is sensible and broadly meets the recommended guidelines, the long-term dietary and nutritional goals will be achieved. The process has to be one of evolution and not revolution. The ‘healthiness’ of recipes can be improved behind the scenes without the customer being aware or without changing the texture, flavour, appearance or palatability of the end product. Other changes may be more outwardly noticeable and require explanation. It is important that all changes are presented and promoted in a positive light.

0414. **Government Initiatives.** The Government takes many initiatives to improve the health of the Nation including upgrading dietary advice in response to the latest scientific research. These initiatives are published in all forms of media, but for clarity, it is recommended that information is sought from sources that have no commercial imperatives such as the FSA, which routinely publishes current advice and information on their websites (www.fsa.gov.uk or www.eatwell.gov.uk).

The nutritional emphasis is still placed on:

- a. Reducing the consumption of foods that are high in:
 - (1) Dietary fat and more specifically saturated fat.
 - (2) Salt and other sodium sources (expressed as salt equivalents).
 - (3) Refined carbohydrates (sugar).
- b. Increasing the consumption of fruit and vegetables.
- c. Reversing the current societal trend of increased obesity in the population.

0415. **Healthy Catering Policy.** To meet the aims of both the Government and the MoD Fitness and Health Strategy, the DFS Team policy on Healthy Catering is:

‘To educate and inform personnel of the benefits of maintaining a healthy and balanced diet. To provide and market an adequate variety of foods from which our consumers can select meals to meet individual dietary needs within nutritional guidelines’.

0416. **The Principle of 5:4:3:2.** A widely recognised healthy eating principle is known as 5:4:3:2. In essence, this principle states the following:

- a. At least **5** normal portions should be eaten from the fruit and vegetables group per day.
- b. At least **4** normal portions should be eaten from the bread and cereals group per day.
- c. **3** servings should be eaten from the milk and dairy food group per day.

- d. **2** servings should be eaten from the meat and fish group per day.
- e. Fatty and sugary foods should not to be eaten too often and when they are only in small amounts.

0417. **Healthy Eating Awareness Training.** To ensure that all new entry trainees passing through training establishments have at least a basic understanding of the principles of nutrition and healthy eating, an advisory package which includes the publication “UK Armed Forces Personal Guide to Nutrition” (available for issue from DSDC) will be issued to individuals to complement and reinforce the message delivered in a recruit or officer cadet specific lecture. Furthermore, a DVD entitled “Food for Thought” has also been produced (available from BDFL) which is targeted at personnel who have left training to remind them of the important role that healthy eating plays in their lives.

PRINCIPLES OF HEALTHY CATERING – DIETARY FACTORS

0418. **Dietary Fat.** The average UK person consumes dietary fat from the following sources²:

- a. Dairy products; mostly butter and milk – 26%.
- b. Meat and meat products, fish and fish dishes – 31%.
- c. Cereal and cereal products – 18%.
- d. Vegetables; mostly potatoes – 11%.
- e. Other products (savory snacks, nuts and seeds, confectionary) – 14%.

0419. **Types of Fat.** There are basically two types of fat, saturated and unsaturated (including mono and polyunsaturated). The primary function of fat in the diet is as a concentrated source of energy. Eating too much fat causes two main problems: first, fat is very high in energy; second, too much saturated fat is linked with a higher risk of heart disease. The more saturated fat consumed, the more cholesterol builds up in the blood. The cholesterol is then deposited on the inside of the arteries, and especially the heart. Eventually a so-called hardening of the arteries (atheromatous) occurs and the arteries can get blocked, which would lead to a heart attack.

0420. **Amounts of Fat.** A small amount of polyunsaturated fat is needed to help make and repair body cells. The essential message about fats is to cut down total consumption of all types, by using less fat (or removing it), by using a lower fat alternative or replacing saturated fats with polyunsaturated fats. Saturated fats are found in meat, meat products (suet, lard and dripping), dairy products and in some vegetable fats, such as coconut oil and palm oil. They are also found in cakes, biscuits, chocolate, cooking fats, hard margarine, sauces and puddings. Sometimes these fats are listed in the ingredients as hydrogenated vegetable fat/oil. Polyunsaturated fats are found in most vegetable oils like sunflower, corn or soya oils, in special soft margarine labelled ‘high in

² National Diet Nutrition Survey (2008/2009) FSA and Department of Health. www.food.gov.uk

polyunsaturated', in nuts, and in oily fish such as herring, mackerel and trout. Monounsaturated fats are found in olive oil.

0421. **Dietary Fibre.** Polysaccharides provide the rigid and fibrous structure of vegetables, fruits and cereal grains, including the cell walls, which enclose the starch granules. They are insoluble in water. Cellulose and certain other indigestible polysaccharides are collectively known as dietary fibre. In a normal Western diet the only foods that provide dietary fibre are cereal products (like wheat and rice), beans, peas, vegetables, and fruit. Dietary starch is only found in plant foods, especially cereals and starchy vegetables, such as potatoes.

0422. **Dietary Sugar.** Although all sugars and starches absorbed by the body provide similar amounts of energy, they have different physiological effects. An excessive consumption of sugar is associated with increased tooth decay and the development of obesity and may be a predisposing factor to maturity onset (Type 2) diabetes. Sugar provides 'empty' calories, in that it contains no other nutrients. The main function of sugar in the diet is to increase palatability hence its significant use in processed and manufactured foods.

0423. **Dietary Salt.** The amount of common salt we need to eat each day is about 1 g, which we can get by eating natural foods with absolutely no added salt. On average, we eat 9 g every day and this high intake is thought to be a predisposing factor to heart disease and high blood pressure. The FSA currently recommends that adults should eat no more than 6 g of salt per day. About three quarters of the salt eaten is already present in the products you purchase, the remainder is added as seasoning during cooking and at the table.

0424. **Healthy Catering – Implementation and Marketing.** Before any changes are made to existing systems to implement healthy catering, it is important that customers are prepared for change. This can be achieved through education and promotional material such as posters and information leaflets explaining the benefits of a healthy diet, and by identifying the healthier dishes of the day.

0425. **Marketing Principles.** There are four basic 'P' principles of marketing that should be applied to promoting healthy eating. These principles are:

- a. Provide a good quality **Product**.
- b. Where necessary, **Price** foods appropriately and competitively.
- c. **Place** foods in an attractive display with the dishes supporting sound nutrition and healthy eating principles in a prominent position on the servery.
- d. **Promote** foods by using displays, communication, advertising and new ideas.

0426. **Legal Requirements.** Any nutritional claim made must be evidenced within statutory requirements. UK legislation has always made it an offence to give wrong or misleading information. To avoid making any misleading claims only general information on nutritional content should be given. If in doubt do not make "health" claims for your food output. Current UK legislation can be found in the Food Labelling Regulations.³

³ The Food Labelling Regulations (1996) HMSO, London.

0427. **Administrative Initiatives.** Healthy eating initiatives should be promoted by continuing to introduce new recipe and menu options, and by being open to customer suggestions. Changes in sales and consumption patterns of foods high in fats, salt and sugar, should be monitored. Customer comments should be recorded and staff provided with regular feedback. A simple newsletter explaining what has been done and why, will help staff and customers understand the changes being made. It is very important to consider the lifestyle of the average customer before deciding on which changes need to be implemented. Some people are more open to new ideas than others. Therefore it is wise to introduce any changes gradually and to encourage, not force, customers to alter their eating habits. The following points should be remembered:

- a. Ensure that there is always a choice of food. Do not force healthy choices on people.
- b. Change menus to support sound nutrition and healthy eating and identify which are the healthier options.
- c. Effect recipe changes to improve the “healthiness” of popular dishes (e.g. measure and gradually reduce salt added in standard recipes).
- d. Highlight the fact that healthier ingredients are being used (e.g. ‘We only fry in polyunsaturated oil’, or ‘All our recipes use less salt and sugar than before and every opportunity is taken to increase the amount of dietary fibre available’).
- e. Do not allow your healthy eating initiative to rely solely upon gimmicky promotional material on the servery. The initiative should be deeper and more comprehensive through menu planning and the cookery processes adopted in the mess.
- f. Change promotional displays frequently to catch the eye and maintain interest.

0428. **Healthy Catering Food Presentation Initiatives.** Careful presentation of food is a key element in marketing healthy foods. The following points should be considered:

- a. “Healthy” dishes should be the norm within the menu and should be at least as attractive to the eye and nose as those dishes known to be popular but less healthy (e.g. poached or grilled fish should appear to be as generous in terms of portion size, have as good colour and smell and be as appetizing as fish in batter). Place the healthier choices within the customers’ sight and within reach. Keep less healthy options at the rear of the servery. Display foods attractively and make the most of colourful garnishes and presentation techniques.
- b. Vegetables should be presented without fat or cream sauces, these can be offered separately. Salad dressing should be kept to a minimum particularly reduce the salads dressed with mayonnaise to a minimum on the salad buffet. Consider an expanded salad option beyond lettuce, tomato and cucumber (e.g. use of pulses, grains and the whole range of vegetables and fruits).
- c. Resist the use of cream within desserts, to decorate the desserts or to accompany desserts and consider alternatives (e.g. yoghurt, fromage frais, fresh and dried fruits).

- d. A variety of homemade breads and rolls, which include wholegrain varieties, could be provided. This bread variety should be followed through to sandwich production for packed meals. A selection of higher fibre biscuits and crisp breads should also be available.
- e. Keep the salt at the servery or at a central service point rather than on each table.
- f. Keep sugar sachets at beverage dispensers rather than on the table.
- g. Offer a choice between skimmed, semi-skimmed and full-fat milk. These are all available for milk dispensers and in individual cartons. Also offer a choice of milks in coffee and other hot drinks.
- h. All staff should be approachable, friendly and well informed about the healthy eating programme.

0429. **Healthy Catering Implementation – Food Preparation.** It is likely that any changes made behind the scenes will probably go undetected by the customer. Other changes such as providing a choice between white and wholemeal bread will be more noticeable. Today's trend towards healthier options is very likely to increase the demand for healthy eating dishes. Seek to make changes to recipes gradually to allow adaptation and acceptance of the revised dish.

0430. **Reducing the Amount of Fat in the Diet.** To reduce the amount of fat, particularly saturated fat, in recipes and menus, the following practices should be adopted:

- a. Recipes should be checked and, wherever possible, the fat content should be reduced.
- b. Provide more chicken and fish and reduce the amount of red meat in menus. When using red meat, make sure it is lean and trim off any visible fat and skin before cooking. Drain off excess fat.
- c. Avoid frying, especially deep-frying. When frying, use a fat high in polyunsaturates, fry at the correct temperature, filter and change the oil regularly as it gradually becomes saturated with use.
- d. Try dry grilling, baking, poaching, boiling or steam roasting using cooking foil in preference to traditional frying or roasting.
- e. Stir-frying, as it uses less oil, is a worthwhile alternative option for consideration. Measure oil for cooking using tablespoons rather than pouring it straight from a container.
- f. Use low fat or polyunsaturated fats, rather than saturated fats such as butter, hard margarine, ordinary soft margarine, dripping or lard.
- g. Use large, straight-cut chips to reduce the overall surface area that absorbs fat.
- h. When making stews, casseroles, soups or gravy, skim off the fat continuously.

- i. When preparing chicken, remove the skin first, since most of the fat content is just below the skin and comes away with it.
- j. In sandwiches use a low fat spread thinly and avoid the use of mayonnaise type products.
- k. Use lower fat cheeses such as Edam, cottage cheese or the growing range of half-fat cheeses.
- l. Use plain yoghurt instead of cream, or use half of each.
- m. Do not add fats to cooked vegetables as a garnish or for preparation.
- n. Avoid too many pastry dishes.
- o. Dress salads with yoghurt, lemon juice and vinegar. Low fat derivatives of mayonnaise and yoghurt can also be used.
- p. Use skimmed or semi-skimmed milk for cooking.
- q. Reduce the amount of fat in pastries and dough.

0431. **Increasing the Amount of Fibre-Rich Starchy Foods in the Diet.** To help increase the amount of dietary fibre that can be gained from the diet, as well as retain essential vitamins, the following practices should be adopted:

- a. Offer wholemeal and granary breads as well as other types.
- b. Use thicker bread for sandwiches.
- c. Gradually introduce a percentage of whole flour into your pastry, 25 – 30% wholemeal flour to 70 – 75% white flour is readily acceptable at first.
- d. Offer jacket, boiled or mashed potatoes as well as chips and other fried varieties.
- e. Use wholemeal pasta, brown rice, wholegrain cereals and pulses as an alternative to refined products.
- f. Use beans, pulses, rice and pasta more often and in some dishes as a whole or partial substitute for meat (e.g. in casseroles, stews or curries).
- g. Offer wholegrain cereals (not sugar coated), plenty of whole grain toast and rolls as an alternative to cooked breakfasts.
- h. Where possible offer fresh fruit and fresh salad at all main meals. Unsweetened tinned fruit would also be acceptable, although there is no fibre in most fruit juices.
- i. Increase the use of raw vegetables in salads.
- j. Use wholemeal breadcrumbs as a crunchy coating instead of batter for fish etc.

- k. Leave skins on vegetables where possible. Clean with a brush or peel them thinly.
- l. Most dried beans and pulses need soaking overnight before thoroughly boiling for at least 10 minutes in fresh water. Cooked beans freeze very well and it is useful to have a few different types ready in the freezer. The quickest pulses to prepare are red lentils, continental lentils and aduki beans. None of these need soaking overnight so you can cook them straight away.

0432. **Reducing the Amount of Sugar in the Diet.** To reduce the amount of sugar in recipes and menus, the following practices should be adopted:

- a. Gradually reduce the amount of sugar in recipes.
- b. Avoid using sugar as a garnish (e.g. dusting pies).
- c. Offer fresh fruit or tinned fruit in natural juices as a pudding.
- d. Offer low-calorie drinks, unsweetened fruit juice and iced water as alternative to soft drinks.
- e. Offer artificial sweeteners to customers.
- f. Use unsweetened low-fat yoghurt and pureed fruits in season to make your own yoghurt.
- g. Offer wholegrain breakfast cereals rather than those coated with sugar or honey.
- h. Reduce the amount of sugar used in cooking. Experiment with a slight reduction initially, if this works increase the percentage reductions to 25 – 50%. Amend your recipes accordingly.

0433. **Reducing the Amount of Salt in the Diet.** To assist individuals to reduce their salt intake, the following practices should be adopted:

- a. Gradually reduce the quantity of salt used in recipes. Use herbs and spices to enhance the flavour and to garnish food, or substitute with a low salt product.
- b. Avoid tinned vegetables, which contain salt (check the labels). If there is no alternative, pour the liquid away and rinse before use.
- c. Avoid using processed foods in general because many of them contain salt or other sodium compounds such as monosodium glutamate. Use homemade soup rather than tinned or dried.
- d. Try using unsalted low-fat spreads.
- e. Use less salt in cooking. In many instances salt can be removed from a recipe altogether (e.g. when using prepared stock). Always taste before adding salt.

- f. Do not salt chips or other foods before serving; leave the choice to the customer.
- g. Try to make salt less accessible to customers (e.g. place salt behind the counter or on a separate table).
- h. Avoid using stock cubes and similar proprietary products excessively as they contain a high percentage of salt. Prepare your own stock and use vegetable water for gravy.

0434. **Recommended Reading.**

Brown S; 1985; "Healthy Living Cookbook"; Dorling Kindersley Publishers Ltd.

Ceserani and Kinton; 1992; "Practical Cookery" - 7th Edition"; Hodder and Stoughton Ltd.

Department of Health; 2008; Healthy Weight, Healthy Lives – A Cross Government Strategy for England (Change 4 Life and 5 a Day).

Department of Health; 1995; Government White Paper "The Health of the Nation – Fit for the Future" and 2004; The Health of the Nation white paper.

Department of Health; 1990; "Catering for Health - The Recipe File"; HMSO.

Drummond K E, Vastano J C and Vastano J F; 1993; "Cook's Healthy Handbook"; John Wiley and Sons Inc.

Food Standards Agency; 2010; Eatwell plate. www.eatwell.gov.uk.

Stevenson, Daniel R; 1991; "Basic Cookery – The Process Approach"; Stanley Thornes (Publishers) Ltd.

The Commanders' Guide to Nutrition.

The Food Labelling Regulations; 1996; HMSO.

UK Armed Forces Personal Guide to Nutrition; 2006.

UK Military Dietary Reference Values (MDRV); 2008; QinetiQ.

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CHAPTER 4 Annex A - UK MoD NUTRITION POLICY STATEMENT

The UK Ministry of Defence (MoD) undertakes to provide military personnel with a basic knowledge of nutrition, with the aim of optimising physical and mental function, long-term health, and morale. Educators will use effective education techniques, and programmes developed by, or in consultation with, registered dietitians and other qualified personnel. Programmes will reflect current nutrition knowledge and scientific research findings, and may contain other appropriate information, such as that provided by the UK Department of Health. Advice on the nutritional needs of pregnant or lactating female military personnel, or individuals requiring nutrition therapy for conditions such as illness, injury, infection, chronic disease, or trauma, will be available from qualified personnel on request.

The UK MoD undertakes to provide a variety of healthy and palatable food and beverage choices to military personnel to enable them to adopt healthy eating habits, a balanced diet, and to ensure optimal fitness and performance. Contract caterers will be required to provide food at the point of service that meets these requirements.

UK Operational Ration Pack(s) (ORP) will continue to be provided to sustain troops on operations and during field exercises, with the aim of preserving life, preserving both physical and cognitive function, maintaining mood and motivation, preventing fatigue, and speeding up recovery. ORP will be designed to meet the energy and nutrient requirements of military personnel operating for long periods in both temperate and extreme environments. The exception to this will be any form of nutritionally-incomplete survival ration, or restricted ration.

The UK MoD has developed UK Military Dietary Reference Values (MDRV) for a range of macro- and micro-nutrients. The guidelines are appropriate for the healthy end-user, and are divided into training and operational MDRVs as well as non-operational MDRVs for Adults (19 – 50 years old) and Adolescents (15 – 18 years old).

Specific Information

Details of classification, common sources and the functions of nutrients are developed in the table at Annex B. Specific comments or feedback relating to the UK MoD Nutrition Policy Statement or the information detailed in the table should be directed to the DFS Team Policy desk.

Sponsor – Institute of Naval Medicine (INM)

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CHAPTER 4 Annex B - CLASSIFICATION, COMMON SOURCES AND FUNCTION OF NUTRIENTS

NUTRIENT	TYPE	DIETARY SOURCES	FUNCTION	REMARKS
Carbohydrate (CHO)	Complex (starches)	Grains – wheat, barley, oats, rye either as whole grains or as flour. Pulses – peas, beans, lentils. Bananas.	Primarily the production of energy. Maintaining the glycogen stores of the body. Efficient metabolism of fats. Protein sparing (to minimise the use of protein as an energy source).	Diets high in complex CHO are proven to be healthier than those high in simple CHO.
	Simple (refined sugars)	Sucrose (table sugar), maltose (sugar from grains), lactose (milk sugar).		
		Glucose, fructose (fruit sugar), galactose – all results of digestion of above sugars and starches.		
Fat	Saturated	Animal fats and few vegetable oils (palm, coconut).	Production of Energy. Carriage of fat soluble vitamins. Provision of essential fatty acids. Satiety. Protection of the body and organs (cushioning against impact/pressure).	Fatty acids describe a component of whole fat molecules. Essential fatty acids are fatty acids that the human body requires from external sources and differ from other fatty acids which can be created by the human body by chemical conversion of other fatty acids.
	Unsaturated	Most vegetable oils.		
Protein	High Biological Value	Eggs, milk (and milk products), meat, fish.	Growth, repair and maintenance of all living tissue. Production of enzymes and hormones. Provision of essential amino acids. Production of antibodies.	Protein is formed from chains of linked amino acids. Most human amino acids can be derived from others in the diet, but 8 for adults and 10 for children must be derived from the external environment. The higher value protein contains the greatest number of essential amino acids.
	Medium Biological Value	Nuts and soya.		
	Low Biological Value	Cereals and pulses.		

NUTRIENT	TYPE	DIETARY SOURCES	FUNCTION	REMARKS
Vitamins	Water Soluble:			Owing to water solubility there will be losses during food processing particularly in soaking and discarded cooking liquor.
	B1	Thiamine	Most foods, but richest sources are pork, offal, seeds and yeast.	Metabolism of CHO especially within the nervous system. Heat Sensitive. Deficiency disease is <i>Beri Beri</i> .
	B2	Riboflavin	Richest sources are milk and milk products, liver, kidneys, eggs and whole grains.	Metabolism of CHO and maintenance of specific human tissue. May be destroyed by Ultra Violet light including that found in natural light.
	B3	Niacin	Milk and milk products, eggs, grains except maize, tapioca, sago and cassava.	Metabolism of CHO. Deficiency disease is <i>Pellagra</i> .
	B6	Pyridoxine	Meat, fish, whole cereals, potatoes, bananas and to a lesser extent other fruits and vegetables.	Metabolism of amino acids including conversion of tryptophan to niacin. Formation of haemoglobin in red blood cells.
	B12		Animal proteins the richest source being the liver where it is stored.	Brain and nervous system function. Red blood cell production. Deficiency disease is <i>Pernicious Anaemia</i> . To absorb B12 from the gut a substance called "intrinsic factor" is required the lack of which will induce deficiency.
		Folate	Most foods.	Production of red blood cells and cell nuclei. An anaemia like Pernicious anaemia but which does not respond to treatment with B12.
		7 other B vitamins	Most foods.	Most metabolic processes particularly CHO metabolism. If the diet contains sufficient of the above it is unlikely to be deficient in these vitamins.
	C	Ascorbic acid	Fruits (mainly citrus), vegetables mainly green leafy vegetables and potatoes, freshly slaughtered meat particularly the liver.	The development and maintenance and repair of all tissue, notably the cell structures in connective tissue, blood vessel walls, bone marrow, teeth and bones. Deficiency disease is <i>Scurvy</i> , but a low intake may impair the rate of recovery from wounds and bone fractures. Vitamin C is a very sensitive to heat, contact with metals, alkalis, light and air. Hence huge losses from food will be occasioned by food preparation, processing and cooking.

NUTRIENT	TYPE		DIETARY SOURCES	FUNCTION	REMARKS
Vitamins	Fat Soluble:				As Fat Soluble vitamins cannot easily be excreted a grossly excess intake may lead to medical problems.
	A	Retinol	Liver, egg & dairy products	Facilitates light perception in dim light conditions. Bone production. Skin tissue and covering tissue of organs.	Deficiency is “night blindness”. Vitamin A is destroyed by oxidation when exposed to air and heat or light.
		Carotene (Pre Vitamin A)	Vegetables.	Can be converted to Vitamin A to support the functions above.	Cooking processes enhance absorption.
	D		Oily fish, eggs, fortified products such as margarines or breakfast cereals.	Absorption and metabolism of calcium and phosphorus for bone creation and repair.	Deficiency is rickets and osteomalacia. Most vitamin D is created in the human body by the action of ultra violet light on chemicals in the skin cells.
	E		Seed oils.	Not fully known.	A diet with sufficient vitamin A is unlikely to be deficient in vitamin E.
	K		Produced for humans in the large intestine by bacteria. Liver.	Blood clotting.	
Minerals	Sodium		Naturally most food to widely varying degrees and from added chemicals to food such as sodium chloride (salt), sodium bicarbonate, Monosodium glutamate.	Fluid balance throughout the body. Controlling body temperature through fluid balance (sweating). Structure of muscle and cartilage.	Sodium, commonly referred to as salt, is necessary in widely varying amounts dependent on the environment and the amount of work undertaken. In temperate climates the British diet with a high content of processed foods is thought to contain too much sodium, which leads to a predisposition to heart and blood pressure problems.
	Potassium		All foods.	Cell structure. Nerve message transmission. Control of heartbeat rate. Interactive with sodium for fluid balance.	Excess potassium will have a deleterious effect on the normal heart beat and hence could be, in the short term, potentially more lethal than sodium.

NUTRIENT	TYPE	DIETARY SOURCES	FUNCTION	REMARKS
Minerals	Calcium	Milk and milk products, eggs, green vegetables and fish.	Bones and Teeth. Transmission of nerve “messages”. Muscle contraction.	Deficiency leads to Osteoporosis, Osteomalacia and a predisposition to bone fractures including stress fractures.
	Phosphorus	Most foods but offal very rich source.	In proportion to calcium for bones and teeth. DNA. Energy transference and storage.	Excess phosphorus will inhibit the absorption of calcium.
	Iron	Liver, Red meat, eggs, wholemeal bread and vegetables.	Haemoglobin – the red pigment of blood – used for the carriage of oxygen round the body. Iron within cells essential for use of oxygen in the cells.	Deficiency is anaemia. Absorption will be inhibited by pyruvic acid in bran and may not be easily absorbed from vegetables and whole grains. Iron is lost from the body through bleeding, sweating and sloughed dead skin.
	Others (Trace elements)	All foods in minute amounts.	All bodily functions.	Includes magnesium, chromium, Zinc, copper, manganese, molybdenum.

Note:

A more comprehensive summary of nutrients may be found in HMSO Reference Book 342 – Manual of Nutrition.