# Module 1 Introducing Physiological Measurements

#### Learning Outcomes

When you have completed this programme you will know and understand:

- 1. how to prepare the service user, the necessary equipment and the resources for taking physiological measurements
- 2. how to apply standard precautions and other relevant health and safety measures, particularly those appropriate to the setting and the procedure
- 3. how to confirm that sufficient and necessary forms for record-taking are available for immediate use
- 4. how to ensure that environmental conditions are set at appropriate levels to maintain individual comfort throughout the procedure
- 5. how to take the measurement at the prescribed time and in the prescribed sequence
- 6. how to use the appropriate equipment to obtain an accurate measurement
- 7. how to reassure the service user throughout the measurement and answer questions and concerns they may have clearly and concisely.

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#### Introduction

Taking physiological measurements is a practical activity. This programme aims to provide you with the knowledge and understanding that underpins the taking and recording physiological measurements as part of the individuals care plan. However, it cannot teach you the practical skills which are required to perform the job effectively and safely.

Part of the learning processes for this module requires you to investigate the legislation, policies, procedures and protocols which affect your work particularly in relation to:

- 1. taking physiological measurements
- 2. health and safety and infection control measures
- 3. handling of equipment
- 4. accountability and responsibility for checking equipment.

It is possible that there may be areas in which the guidance given in this unit differs from your workplace policies and procedures. In such instances, please discuss matters with your manager and, if needed, refer directly to the relevant National Standards and Regulations.

Please note that your responsibility to record physiological measurements may at some stage change in accordance with the service user's condition for example when care and such procedures become the registered practitioner's responsibility.

Background information about the various measurements indicated is given first, providing foundation knowledge for the rest of the programme.

Throughout the programme, you will have the opportunity to demonstrate your understanding of these elements through activities.

#### **Introducing Physiological Measurements**

This section introduces information regarding the types of physiological measurements you may be asked to undertake and the normal limits for them, allowing you to recognise abnormal limits and the factors that affect them.

One of the main reasons for taking physiological measurements is to ensure that the body is maintaining a constant internal environment. You may have heard of *homeostasis*, a process by which the human body maintains a constant internal environment, despite any external changes (i.e. things going on outside the body, such as changes in temperature).

The process of homeostasis is a complex one, and it is not necessary to know it in depth. However, it will allow you to appreciate that when a measurement varies from its normal value, various mechanisms in the body try to re-establish a constant internal environment by bringing the reading back to a normal value.

When carrying out 'observations', communication skills are essential in order to promote the persons confidence in your ability to perform these techniques. You will need to show an in-depth understanding of the types of equipment you're using, the reasons for taking physiological measurements, and an awareness of both, normal and abnormal values of measurements. You will also need to demonstrate responsibility for health and safety measures and infection control procedures. If the service user is unsure of your ability, this can often affect the results of the measurement.

#### What are Physiological Measurements?

These are measurements we take of the various systems in the body to ensure that they are functioning in the way they are supposed to.

When we carry out physiological measurements - such as measuring temperature, pulse and respiration - we are monitoring for signs of abnormality (i.e. anything that falls outside of the 'normal' range). Health professionals will then be able to draw conclusions about the health status of the individual and any treatments they may require (which may involve nursing care or medical attention).

The competence you need to show in this module covers taking physiological measurements as part of the individual's care plan. Measurements can include:

- 1. blood pressure, either manually or electronic
- 2. pulse rates and confirming pulses at a variety of sites, e.g. pedal pulses
- 3. pulse oximetry
- 4. temperature
- 5. respiratory rates
- 6. height, weight, body mass index (BMI), girth.

The following gives a brief description of each type of measurement and the factors that may affect them.

# Temperature

Temperature is a useful gauge of health and illness. Body temperature is maintained at a fairly constant level, either by voluntary mechanisms (e.g. putting on clothing, or going indoors) or involuntary mechanisms (e.g. when our body automatically increases the rate at which it loses heat.

Most people think of a 'normal' body temperature as an oral temperature of 98.6°F (37°C). This is an average of normal body temperatures.

Fever (also known as pyrexia, or a febrile response) describes an increase in internal body temperature to levels which are above normal, e.g. higher than 37°C, (98.6°F). It is associated with a quickened pulse rate. A temperature recorded as below normal is called hypothermia.

1. Hyperpyrexia - is an excessive and unusual elevation of body temperature above 107.6°F (42° C) This is also known as hyperthermia

2. Hypothermia - when a person's body temperature is lower than 35°C.

Temperature is usually recorded in order to:

- 1. establish a base line for that person
- 2. monitor response to medication following
- 3. detect hypothermia
- 4. detect pyrexia
- 5. detect hyperpyrexia.

## How Body Temperature is Maintained

Body temperature is a measure of the body's ability to generate and get rid of heat. The body is very good at keeping its temperature within a narrow, safe range, in spite of large variations in temperatures outside the body.

When you are too hot, the blood vessels in your skin expand (dilate) to carry the excess heat to your skin's surface. You may begin to sweat and, as the sweat evaporates, it helps cool your body.



When you are too cold, your blood vessels narrow (contract) so that blood flow to your skin is reduced to conserve body heat. You may start shivering, which is an involuntary, rapid contraction of the muscles. This extra muscle activity helps generate more heat. Under normal conditions, this keeps your body temperature within normal limits.

#### Factors Influencing Temperature

1. Age - Newborn babies find it difficult to regulate their temperature, as they have a relatively thin layer of insulation. Young children have a slightly higher body temperature, caused by metabolic processes involved in growth. Older people have a lower body temperature because metabolic rate drops as we age.



- 2. Environment Our thermoregulatory system (that maintains our body temperature) cannot cope with extremes of hot, or cold, which is why people can sometimes develop heat exhaustion and hypothermia.
- 3. Activity Muscle activity produces heat energy, which helps maintain our body temperature. Shivering produces a large amount of heat and is the body's response to cold. People with mobility difficulties, such as those suffering from paralysis, are susceptible to cold.
- 4. Metabolic rate People with high metabolic rates, such as those with overactive thyroid glands, are likely to have a raised temperature.
- 5. Drugs Alcohol reduces temperature. Some narcotics and sedative also reduce our awareness of cold environments.
- 6. Time of day Our body temperature is usually lower at night (when we sleep) and peaks during the late afternoon/early evening)
- 7. Menstrual cycle Around ovulation, women may have a higher body temperature
- 8. Infection Body temperature rises with the onset of infection
- 9. Digestion Eating and digesting food can raise the body temperature.



# Prepare the Environments and Resources for Use When Taking Physiological Measurements

# Activity 1

Try and locate your own pulse at each of the main sites (tick each box as you find them).

Brachial artery – inside of elbow joint	
Carotid artery – at the neck	
Femoral artery – in the groin	
Popliteal artery – at the back of the knee	
Posterior Tibial artery – at the inner side of each ankle	
Radial artery – at the wrist	

# Activity 2

Find a partner to work with, and do the following:

- a) Measure the resting pulse rate of yourself and your partner
- b) Suggest some form of mild exercise that is enough to get you and your partner out of breath, such as running on the spot for 30 seconds (keep in mind your state of fitness!)
- c) Measure your pulse rates immediately after the exercise, and again every minute until the pulse rate returns to the normal 'resting' rate.

Complete the chart below to show your results

	Person one	Person two
Resting pulse rate		
Immediately after exercise		
One minute after exercise		
Two minutes after exercise		
Three minutes after exercise		
Four minutes after exercise		
Five minutes after exercise		