بسم الله ، اللهم لا سهل إلا ما جعلته سهلا ، وأنت تجعل الحزن إذا شئت سهلا يا أرحم الراحمين

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مادة : علوم صحية

Review the health sciences exam question

1.2 Medical root words, prefixes, suffixes and combining vowels

Parts of medical words

Medical words are made of different parts. They can include the following:

- Prefix
- Root word
- Suffix
- Combining vowels

Recognising each different part of the medical word you are looking at will help you to understand how medical terms are structured (made up).

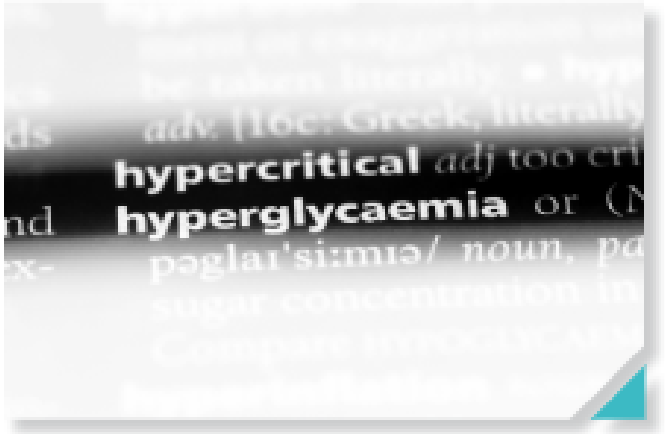
Look at the example of a medical term below.

hyperglycaemia

This is a long word that is hard to say. But it can be broken down into three parts.

hyper / glyc / aemia

- The prefix in this word is **hyper.** A prefix goes at the start of a word.
- The root word is **glyc.** This is the basic part of the word.
- The suffix in this word is **aemia.** A suffix goes at the end of a word.



2	HSC.5.3.01.001 Explain the difference between communicable and non-communicable diseases.	What is a communicable disease? What is a non-communicable disease?	39
3	HSC.5.3.01.004 Describe diseases of the respiratory system.	List communicable diseases. List chronic diseases.	39

Classifications of disease

Communicable and non-communicable

Diseases can be either communicable or non-communicable.

- Communicable diseases can be passed or spread from one person to another.
- Non-communicable diseases cannot be passed from one person to another.

Some examples are:

Communicable diseases	Non-communicable diseases
influenza (flu)	epilepsy
COVID-19	hypertension
gastroenteritis	diabetes
malaria	multiple sclerosis

Acute and chronic

Diseases can be either acute or chronic.

- Acute diseases last a short length of time, usually less than three months.
- Chronic diseases last a long time and sometimes they last for a person's whole life.

Some examples are:

Acute diseases	Chronic diseases
COVID-19	arthritis
common cold	diabetes
pneumonia	asthma
influenza (flu)	allergies

3.2 Smart medical devices and wearables

The use of smart medical devices and wearables

Smart devices and wearable technology in healthcare includes electronic devices that people can wear. Simple examples include smart watches and activity trackers such as Fitbits. They are designed to collect data about the user's health and fitness. There are also wearable devices for more serious conditions such as diabetes and heart disease.

Discussion: Monitoring your health

Do you use any smart devices or wearables to monitor your health? If so, what is the function of your device? Can anyone use this device or is it only designed for people with a certain medical requirement? Discuss with your class.

Devices work by collecting the user's health data. Then it creates a personalised database of the user's health information. The user can track their information, challenge their well-being goals, or have their data collected to be shared with friends, family or a healthcare professional.

Think

People have become more interested in tracking their own health and fitness in recent times. It is suggested that the COVID-19 pandemic has increased awareness of unexpected illnesses and health problems.

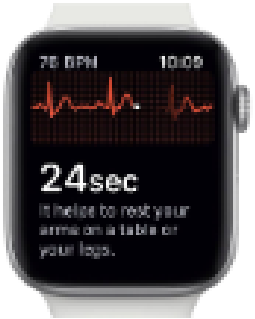
Examples of smart medical devices and wearables

Fitness trackers and smart watches

These are currently the most commonly used medical wearable. Fitness trackers are usually wristbands that have sensors to keep track of physical activity and heart rate. They can sync to mobile applications and provide fitness guidance for users.

Smart watches are constantly evolving. In recent times they have many advanced features including:

- tracking workouts in different exercise modes.
- stress monitoring.
- mental health tracking.
- movement reminders.
- sleep tracking.
- measuring step-count.
- measuring heart rate.
- measuring blood oxygen level.
- taking an electrocardiogram (ECG) anywhere at any time and notifying the user if something is wrong.



Smart watches can also perform tasks that people do on their phones such as read notifications, send simple messages, make phone calls and play music while offering the health-related benefits of fitness trackers.

5	HSC.5.4.01.003 List the healthcare-related mobile applications and e-services used in the United Arab Emirates.	Which app is used in the UAE for COVID-19 testing results? Describe the features on the Al Hosn application.	77

Applications and e-services used in UAE

Alhosn

Video: Alhosn UAE app

Watch the video that explains the Alhosn app and how it works.

The UAE's most popular health-related app of 2021 is Alhosn. The app was created by the Ministry of Health and Prevention (MoHAP) along with Dubai Health Authority and the Department of Health Abu Dhabi.

Alhosn is the UAE's official app for COVID-19 testing results, vaccine certification and contact tracing. The app was created using artificial intelligence (AI) technology similar to that used by lots of other countries around the world.

What is contact tracing?

Video: Alhosn contact tracing

Watch the video which explains how the Alhosn app carries out contact tracing for COVID-19.

Contact tracing is the process of identifying people who have been in contact with an infected person. During the pandemic, contact tracing has been important in stopping the spread of COVID-19. Thanks to technology and the use of GPS and Bluetooth on apps like Alhosn, contact tracing is faster and more secure than before.

Head injuries

A head injury can be defined as any physical injury to the scalp, skull, or brain. Head injuries can range from a minor bump on the skull to a serious brain injury. Head injuries can be:

Open head injuries: injuries where an object breaks the skull. Those injuries are very common in car accidents, specially when a person goes through the windscreen of a car.

Closed head injuries: injuries in which the skull is not broken by any objects.

Head injuries include the following:

- Concussion
- Scalp wounds
- Skull fractures

Did you know?

A concussion is a type of head injury that usually happens as a result of falls, car accidents and sports injuries. It occurs when the head or body is hit so hard that the brain moves inside the skull.

Symptoms of a head injury

- Unconsciousness
- Unresponsive
- Acting sleepy or confused
- Fits or seizures
- Difficulty speaking or staying awake
- Problems with the senses – such as hearing loss or double vision
- Vomiting
- Blood or clear fluid coming from the ears or nose
- Amnesia (memory loss)
- Sudden swelling or bruising around both eyes or behind the ears
- Difficulty with coordination and walking

Think

Head injuries need immediate medical attention. This is because there is a risk of serious brain damage.

7	HSC.3.5.01.002 Interpret simple medical root words, prefixes, suffixes and combining vowels.	Identify the meaning of the prefix 'tachy-'. What medical prefix means 'slow'?	16

1.2 Medical root words, prefixes, suffixes and combining vowels

In the table below, there are some common medical prefixes. Try to become familiar with these.

Prefix	Prefix meaning	Prefix	Prefix meaning
a- or an-	without or lack of	hyper-	too high
ab-	away from or off	hypo-	too low
anti-	against	inter-	between
ante-	before	intra-	within
brady-	slow	myo-	muscle
epi-	above	tachy-	fast

Below are examples of how the prefixes are used in medical terminology.

Example	Word meaning
anaesthetic	without pain or sensation
abnormal	away from normal or not normal
antibacterial	to fight against bacteria
antenatal	before the birth of a baby
bradycardia	slow heartbeat
epidermis	upper layer of the skin
hypoglycaemia	too little sugar in the blood
hypotension	low blood pressure
intercellular	between the cells
intravenous	within the veins
tachycardia	fast heart rate

Information on a medical record report

1. Personal information

The first part of a medical record report contains the patient's personal information.

Medical record report	
Name:	
Date of birth (DOB):	
Gender:	Male or female
Ethnicity:	Where the patient is from, their religion and the language they speak
Contact information	The patient's address, phone number and email address

2. Medical history

The patient's medical history should be included in the report. The questions in this section can include:

Medical conditions:	Any medical conditions that the patient has, or any conditions they have had in the past. ⊙ This can help to diagnose and treat their current medical issue.
Medications:	Any medication that the patient takes. ⊙ This is important because some medications should not be taken with others.
Allergies:	Any allergies that the patient has. ⊙ The patient could be allergic to certain medications which could cause them harm.

8	HSC.3.5.01.003 Identify medical terminology used in medical record reports.	What personal information is recorded in a medical record report? Where are vital signs recorded in a medical record report?	23-25

1.3 Medical record reports

3. Medical complaint

The reason why the patient is visiting the hospital or surgery should be recorded here. Any signs and symptoms of their illness should be written in this section.

Example

In medical terms, a **sign** is evidence of an illness that can be seen by others, such as a skin rash or a cough.

A **symptom** is a feeling or physical change experienced by a patient, such as pain or tiredness.

4. Physical examination

The health professional will complete a physical examination of the patient. The examination will show if the patient has any abnormal signs.

Keyword

examination (physical)

a close and careful study of someone to find signs of illness or injury

A physical examination includes the following checks:

- Height and weight
- Vital signs. These checks are:
  - Blood pressure: the pressure of blood on the artery walls
  - Pulse rate: the number of times the heart beats each minute
  - Respiration: the rate of breathing
  - Temperature: how warm the body is
- Examination of the body and body systems including:
  - head and neck.
  - chest, heart, and lungs.
  - skin and extremities (arms and legs).
  - the stomach.
  - the body's movement.

Keyword

diagnosis

the act of identifying a disease, illness, or problem by examining someone

Common medical terms

Acute

An illness that lasts for a short time, less than three months.

Chronic

A disease or illness that lasts three months or more.

Cure

Something (such as a drug or medical treatment) that stops disease and makes someone healthy again.

Diagnosis

This is when a medical professional identifies the disease or illness that a patient has.

Infectious

A disease that can be spread to other people by germs.

Prognosis

A doctor's opinion about how someone will recover from an illness or injury.

Remission

When the symptoms of the patient's disease get better (but are not cured).

Sign

Evidence of an illness that can be seen by others, such as a skin rash or a cough.

Symptom

A feeling or physical change experienced by a patient, such as pain.

Terminal

Having an illness that cannot be cured.

Treatment

Something that deals with a disease or injury to make someone feel better or become healthy again.

10	HSC.5.4.01.002 Describe how artificial intelligence (AI) is used in healthcare.	List the uses for AI in healthcare. How can AI detect diseases in the early stages?	87-89

Keeping well

AI can help people to stay healthy so that they do not need to visit a doctor as often as they do now. AI is used to develop apps that encourage healthy behaviours and help people to manage a healthy lifestyle. AI also allows healthcare professionals to understand the day-to-day patterns of the people they care for. This means healthcare professionals can give better guidance and support to patients.

Early detection of disease

AI is being used to detect diseases, such as cancer, more accurately and in the early stages. AI is used to review and read mammograms 30 times faster than humans, with 99% accuracy. This level of accuracy reduces the need for unnecessary follow-up examinations or second opinions.

The rise of medical wearables and other devices with AI technology can be used to detect heart disease in the early stages. These devices help healthcare professionals to monitor and detect a potential heart attack at an earlier, more treatable stage.

Decision making

AI can recognise patterns which are consistent among patients with a certain disease. It can use this data to recognise the risk of other people developing a condition based on lifestyle, environmental, genetics or other factors. AI can predict what diseases a person is likely to develop based on these factors.

10	HSC.5.4.01.002 Describe how artificial intelligence (AI) is used in healthcare.	List the uses for AI in healthcare. How can AI detect diseases in the early stages?	87-89

3.5 Artificial intelligence (AI)

Treatment

AI helps doctors to manage patients with chronic diseases based on their individual needs, as compared to all patients with the same disease. AI can help to create individual care plans and help patients with long-term treatment programmes.

AI robots have been used for more than 30 years in healthcare. They range from simple to highly complex surgical robots that can either help a human surgeon or complete operations alone. In addition to surgery, they are used in hospitals and labs for repetitive tasks, in rehabilitation, physiotherapy and in support of those with long-term conditions.

End of life care

People are living much longer than previous generations and are dying in a different and slower way. They have conditions like heart disease, Alzheimer's and osteoporosis. The later years of life can be quite a lonely time for people.

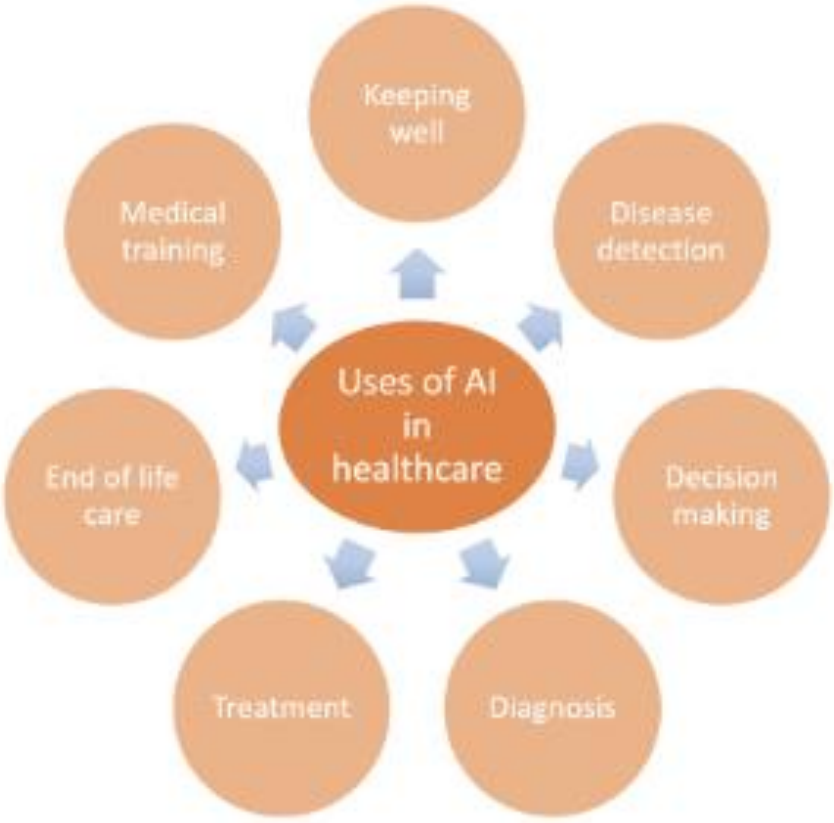
Robots can help people to be independent for longer, reducing the need for hospitalisation. AI combined with newer technology means robots can have conversations and carry out other social interactions with people to keep aging minds sharp and to reduce loneliness.

10	HSC.5.4.01.002 Describe how artificial intelligence (AI) is used in healthcare.	List the uses for AI in healthcare. How can AI detect diseases in the early stages?	87-89

Medical training

AI allows those in training to experience realistic simulations in a way that simple computers cannot. An AI computer can instantly provide learners with a scenario from a large database. Robots can use natural speech to explain their problems as if they are a human. The learner's responses and decisions can be challenged by the robot.

Training can be done anywhere at any time. With the power of AI on a smartphone, training is possible if the healthcare professional wants to refresh their skills in case they are faced with a challenging scenario in a clinic.



11	HSC.5.3.01.002 Describe diseases of the musculoskeletal system.	List diseases of the muskuloskeltal system. How many types of arthritis are there?	42-43

2.2 Diseases of the musculoskeletal system

The musculoskeletal system recap

The musculoskeletal system provides the body form, stability and support and allows the body to move.

It is made up of:

- bones
- muscles
- joints
- cartilage
- ligaments
- tendons
- connective tissue

Did you know?

There are around 206 bones in an adult human's body.

Conditions affecting the musculoskeletal system

Many conditions affect the musculoskeletal system. Although they are more common in older people, musculoskeletal conditions can affect people of any age.

Conditions that affect the musculoskeletal system include:

- Arthritis
- Osteoporosis
- Osteopenia
- Rickets
- Gout
- Sarcopenia
- Spine, back and neck pain
- Other pain disorders and inflammation-causing diseases

Arthritis

Keyword

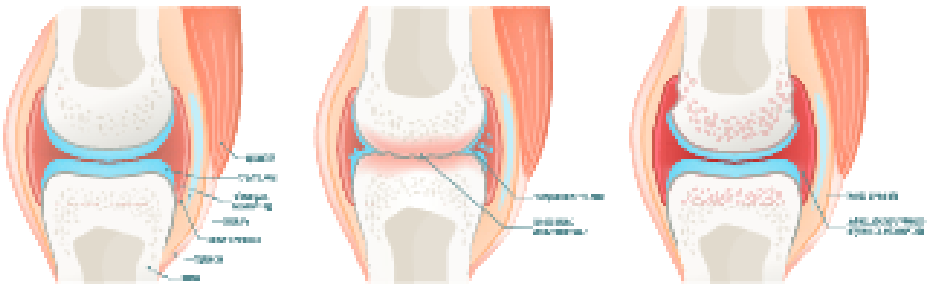
Inflammation

a condition where a part of the body becomes swollen, red, and painful

What is it?

Arthritis is a chronic disease. It is the inflammation of the joints. This happens because of cartilage breaking down between the bones in a joint, which can result in one bone grinding directly on another.

There are over 100 different types of arthritis, but the two most common are called osteoarthritis and rheumatoid arthritis.



Who does arthritis affect?

Arthritis is more common in adults over the age of 65 but it can also develop in children, teenagers, and young adults. It affects more women than men. Arthritis is non-communicable.

Signs and symptoms

- Pain and swelling around the affected joint
- Lack of motion: the joint will not be able to move as much as it should
- Stiffness after sleeping or sitting for a long time
- Grating: a feeling of bones rubbing together inside the joint

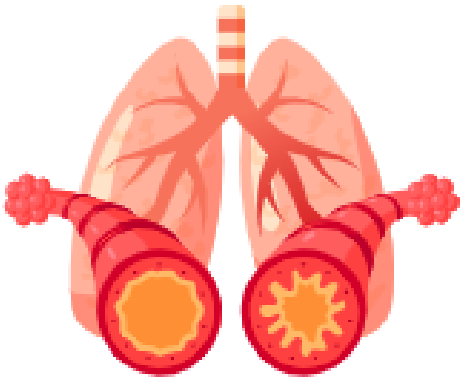
Asthma

Discussion: Asthma

What do you already know about asthma? Do you know anybody who has it? How does it affect them?

What is it?

Asthma is a chronic disease that causes inflammation of the airways. When the airway becomes inflamed, it becomes swollen and makes breathing very difficult.



normal airway asthma

Who does asthma affect?

Asthma often starts in childhood and lasts into adulthood. It is more common if other family members have the disease, or in people who have allergies, or those exposed to smoking.

Signs and symptoms

- Coughing
- Shortness of breath when exercising
- Tightness in the chest
- A wheezing or whistling sound when breathing

Treatment for asthma

There is no cure for asthma, but the treatments available are very effective. They include:

- long-term medications which are taken daily to control the symptoms of asthma.
- medications that can be used during an asthma attack.
- lifestyle changes can manage asthma. Eating a healthy diet, maintaining a healthy weight, doing regular exercise, and not smoking can all help to reduce the risk of asthma attacks.

13	HSC.S.3.01.006 Describe diseases of the circulatory system.	Describe hypertension. List diseases of the circulatory system.	58-59

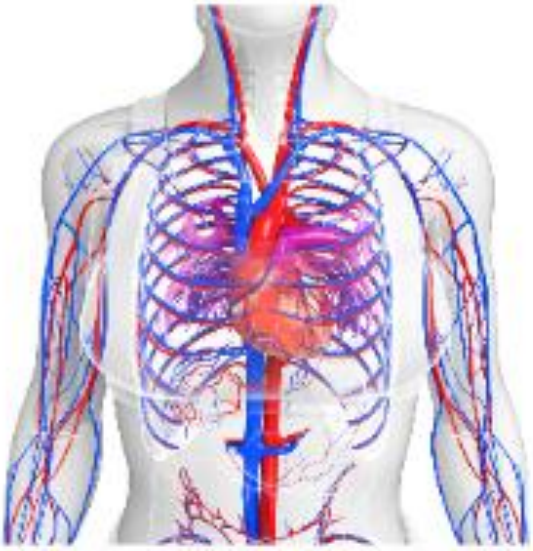
2.6 Diseases of the circulatory system

The circulatory system recap

The function of the circulatory system is to transport blood. Blood is pumped around the body by the heart. This blood carries nutrients and oxygen around the body.

The main parts of the circulatory system are:

- the heart.
- arteries.
- veins.
- capillaries.
- blood.



Conditions affecting the circulatory system

There are many different diseases that affect the circulatory system. They include:

- Hypertension
- Atherosclerosis
- Angina
- Heart failure
- Stroke
- Venous thrombosis

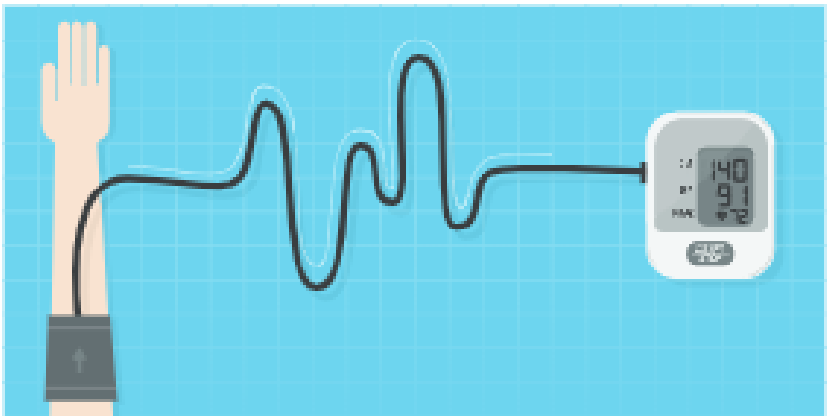
Hypertension

Discussion: Hypertension

Have you heard of the term hypertension? What do you think it means? Do you know any conditions that could be caused by it?

What is it?

Hypertension is also known as high blood pressure. It means that the blood pressure in the arteries is higher than it should be. This makes the heart work harder than normal to circulate blood through the blood vessels. It is a chronic condition.



Remember

A measurement for hypertension is considered to be 140/90mmHg. Last year you learned that normal blood pressure is 120/80mmHg. A reading between these two numbers could mean the person is at risk of developing hypertension.

If hypertension is not controlled it can lead to other serious conditions including:

- heart attack or stroke due to hardening of the arteries.
- heart failure, because the heart is working too hard to pump blood.

2.7 Diseases of the immune system

Treatment for multiple sclerosis

There is no cure for MS, but there are some ways to manage the condition:

- Medication is available to slow the progression of the disease and to manage attacks.
- Physiotherapy to stretch and strengthen muscles, and to help with walking and doing day-to-day activities.

Allergy

What is it?

Allergies happen when the immune system reacts to a substance such as dust, animal hair, or a type of food. The immune system produces antibodies which think that the substance is harmful. This can cause inflammation of the skin, eyes, and airway.

Keyword

antibodies

a substance produced by the body to fight disease

In some cases, allergies can cause a dangerous reaction called anaphylaxis. This is life-threatening.

Who do allergies affect?

Allergies can affect anyone. The risk is higher if there is a family history of allergies.

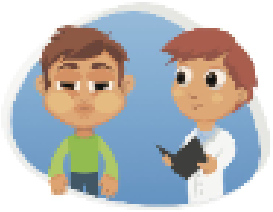
Signs and symptoms

Signs and symptoms can range from mild to severe. **Mild** symptoms include:

- sneezing.
- watering, red, or swollen eyes.
- swelling of the face, lips, or throat.
- itchy mouth or nose.
- bumpy red rash forming on the skin.

A severe allergic reaction is called anaphylaxis. Anaphylaxis can lead to death. It is a medical emergency. Signs and symptoms are:

- severe chest tightness and shortness of breath.
- skin rash.
- rapid weak pulse.
- loss of consciousness.



Treatment for allergies

Preventing allergic reactions can be done by avoiding things that cause the reaction. For example, if someone is allergic to cats, they should not touch them. If someone is allergic to nuts, they should not eat any food containing nuts.

Medications can reduce the immune system reaction and improve symptoms. These are called antihistamines.

If a person has a severe allergy to something, they might carry with them an adrenaline auto-injector. This can save their life if they are experiencing anaphylaxis. You will learn how to use an adrenaline auto-injector later this term.

Here are some of the latest advances in technology which are being used today in healthcare:

- Artificial intelligence (AI)
- Augmented reality (AR) and virtual reality (VR)
- 3-D printing
- 5G
- Robotic surgery
- Artificial organs
- Medical wearables
- Telemedicine services

We will look at many of these technologies in more detail throughout this unit.

Developments in healthcare

Improvements in technology have resulted in major developments in healthcare. Some of these improvements are:

- Patients are diagnosed quicker
- Patients have quicker recovery times
- People are living longer
- Better healthcare facilities
- Modernised hospitals and equipment

Video: Abu Dhabi Telemedicine

Watch the video that shows some of the services that are available through Abu Dhabi Telemedicine.

Telemedicine services can be delivered in most non-emergency cases, doctors can treat the following conditions via telemedicine:

- Coughs and colds
- Asthma
- Allergies
- Headache and fever
- Muscle pain
- Joint and back pain
- Skin problems
- Minor burns
- Obesity
- Mental illness

The telemedicine services aim to provide people at home with the medical services that they require. However, in some cases, the patient needs to be physically assessed by a doctor. If this happens, they will be referred to a hospital.

Think

Do not use telemedicine services in an emergency, instead call 998.

3.4 Augmented reality (AR) and virtual reality (VR)

What are augmented reality and virtual reality?

Discussion: Your use of AR and VR

Have you ever used AR or VR technology before? If so, what did you use it for? Discuss your experience with your class.

Augmented reality (AR) is the technology that allows laying some information, videos and graphics on smart devices over reality (what you can see without technology). Therefore, this technology augments (changes) the real world by adding additional data to it. AR is popularly used in gaming, for trying on clothes or make-up, for seeing conselliations of stars in the sky, among many others.

Virtual reality (VR) is a simulated reality created by computer technology when a person completely enters into a digital environment and cannot see the real environment around them. There is a large selection of VR games available today, as well as car test driving experiences and roller-coaster experiences.

4.2 Stroke

What is a stroke?

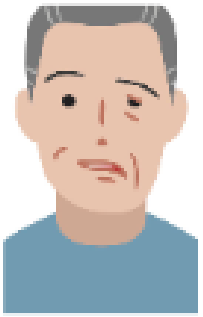
Discussion: Stroke

Have you heard the term stroke before? Discuss with your class what you already know about strokes.

A stroke is a condition that happens when the supply of oxygen to the brain is reduced or stops completely.

This is caused by a blood clot (blockage of blood flow) or a burst in an artery that carries blood to the brain. When a person has a stroke, the cells in the brain begin to die because they are not getting oxygen.

Treating a stroke early is very important, it can reduce the damage caused by the stroke, and it can improve their chances of recovery.



Further information

Strokes can happen to anyone, at any time. In the UAE, between 10,000-12,000 people suffer from strokes every year. Half of these people are younger than 45 years old.

The good news is that strokes are preventable. Smokers are four times more likely to have a stroke than non-smokers. Making other healthy choices, such as doing enough exercise, is another way to reduce the risk of having a stroke.

In a severe stroke, around 1.9 million brain cells die per minute. Therefore, the speed of treatment is very important as every minute counts. The quicker a stroke patient can get help, the more likely they are to survive with little or no disability.

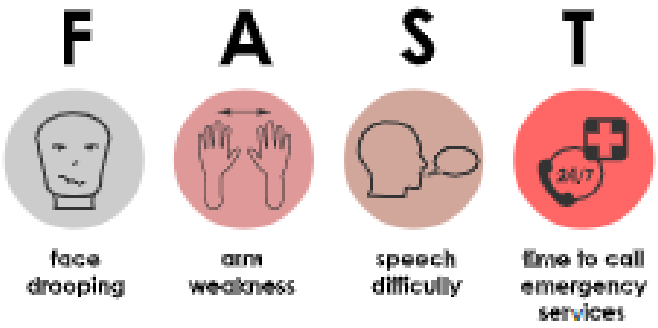
Video: It could be a stroke

Watch the video showing how to tell if someone is having a stroke.

Signs and symptoms of a stroke

Use FAST to recognise the signs of a stroke.

- Face drooping: This is when one side of the face droops. Do they have numbness in their face?
- Arm weakness: Do they feel weakness in one or both arms?
- Speech difficulty: Are they finding it difficult to talk? Does their speech sound different?
- Time: If the answer is yes to any of the above, the person could be having a stroke. It is important to call the emergency services immediately. Let the operator know that you suspect the patient is having a stroke.



Emergency medical care for a stroke

If a person is experiencing any of the above signs and symptoms, you should call the emergency services immediately. Getting treated quickly is very important.

Follow these steps if you suspect someone is having a stroke:

- Call the emergency services or ask someone to call them. Be sure to follow up with them and ask them how long it will take the emergency services to arrive.
- Get the first aid kit and the AED.
- Take note of the time that the patient started to experience symptoms or the time you found them.
- Stay with the person until the emergency services arrive. Give the medical team any details you know about the patient.
- If the person becomes unresponsive and is not breathing properly, be prepared to give CPR.

Signs and symptoms of an allergic reaction

Signs and symptoms of an allergic reaction usually develop within a few minutes of being in contact with the allergen, although sometimes they can develop gradually over a few hours. Most allergic reactions are mild, but some can be very serious and cause a very serious reaction called anaphylaxis. Anaphylaxis affects the whole body and it can be life-threatening.

Signs and symptoms of a mild allergic reaction

- Sneezing and an itchy, runny, or blocked nose.
- Itchy, red, watering eyes.
- Chest tightness, shortness of breath and a cough.
- Itchy, red rash.
- Swollen lips, tongue, eyes, or face.
- Stomach pain, feeling sick, vomiting or diarrhoea.

The symptoms will vary depending on the allergy, and how the person comes into contact with the allergen.

Signs and symptoms of anaphylaxis

They include any of the signs and symptoms from above, but also:

- swelling of the throat and mouth.
- difficulty breathing.
- confusion.
- collapsing and losing consciousness.
- blue skin or lips.

Anaphylaxis is a medical emergency that needs immediate medical treatment.

ANAPHYLAXIS

Treatment plan	This section will record what treatment the patient will receive. This includes: ⊙ any medication they must take. ⊙ any surgery that they need to have. ⊙ recommended lifestyle changes.
Progress	When the patient visits the healthcare professional for follow-up appointments, their progress will be recorded to make sure that the treatment plan is working.

Further information

Unified medical records

The Ministry of Health and Prevention (MoHAP) is creating a database that will digitally store all individual patients' medical records in one place.

By 2022, public and private hospitals across the country will share medical records for the first time.

The unified database will link all medical data of patients. This will give doctors access to all the patient's health information from hospital visits to diagnostic tests from any healthcare facility.

The system will help doctors diagnose patients faster and help them make better decisions about what treatment to offer. This is because they can see the patient's medical history and what treatments they have had in the past.