

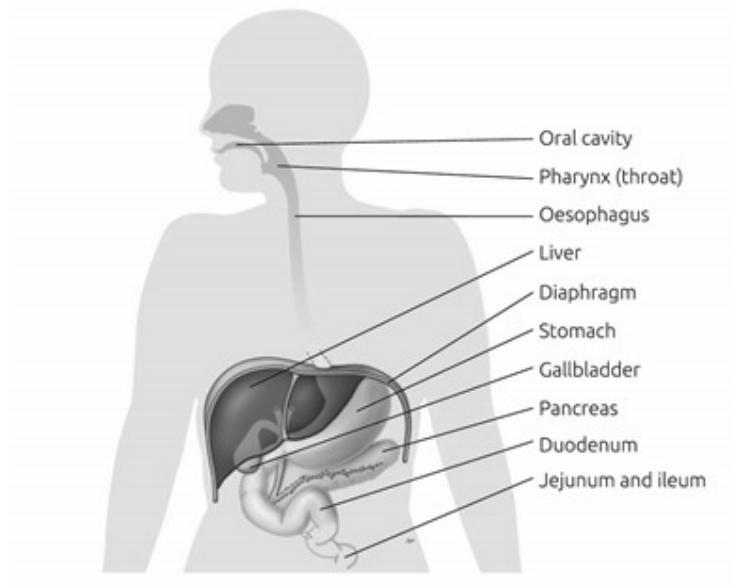
G. GASTROINTESTINAL TRACT, DIARRHOEA, FOOD POISONING AND DIABETES

In this chapter you will learn about:

- The gastrointestinal system.
- Diarrhoea.
- Food poisoning.
- Diabetes.

G.1 GASTROINTESTINAL TRACT

Water and food are essential for the survival of the human body. The unique structure of the gastrointestinal tract (GI) allows it to perform its specialized functions to turn food into the energy for survival and packaging the residue for waste disposal.



- Mouth

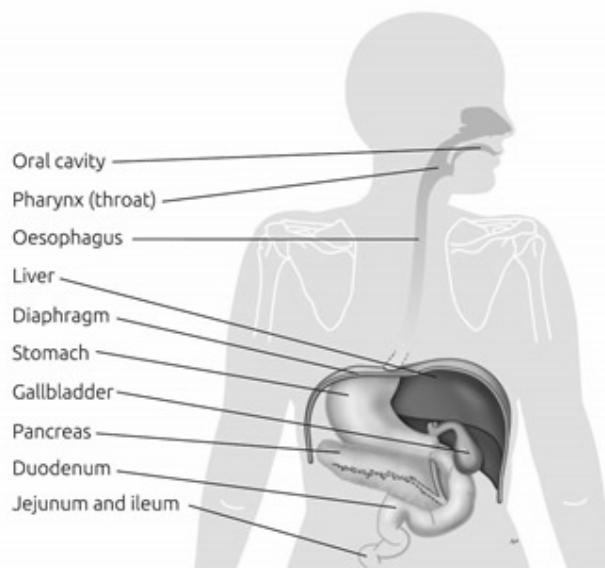
The mouth or *oral cavity* is the beginning of the digestive tract. In fact, digestion starts here when taking the first bite of food. Chewing breaks the food into pieces that are more easily digested, while saliva mixes with food to begin the process of breaking it down into a form the body can absorb and use.

- Oesophagus

Located in *throat cavity* near your trachea (windpipe), the gullet, also called oesophagus, receives food from the mouth when swallowing. By means of a series of muscular contractions, the oesophagus delivers food to the stomach.

- Stomach

The stomach is a hollow organ that holds food while it is being mixed with enzymes that continue the process of breaking down food into a usable form. Cells in the lining of the stomach secrete strong acid and powerful enzymes that are responsible for the breakdown process. When the contents of the stomach are sufficiently processed, they are released into the small intestine.



- Small intestine

Made up of three segments — the *duodenum*, *jejunum*, and *ileum* — the small intestine is an approximately 7 meter (app. 22.5 foot) long muscular tube that breaks down food using enzymes released by the pancreas and bile from the liver. Peristalsis also is at work in this organ, moving food through and mixing it with digestive secretions from the pancreas and liver. The duodenum is largely responsible for the continuous breaking-down process, with the jejunum and ileum mainly responsible for absorption of nutrients into the bloodstream.

Contents of the small intestine start out semi-solid, digested on the way and end in a more liquid form after passing through the organ. Water, bile, enzymes, and mucus contribute to the change in consistency. Once the nutrients have been absorbed and the leftover-food residue liquid has passed through the small intestine, it then moves on to the large intestine, or colon.

- Pancreas

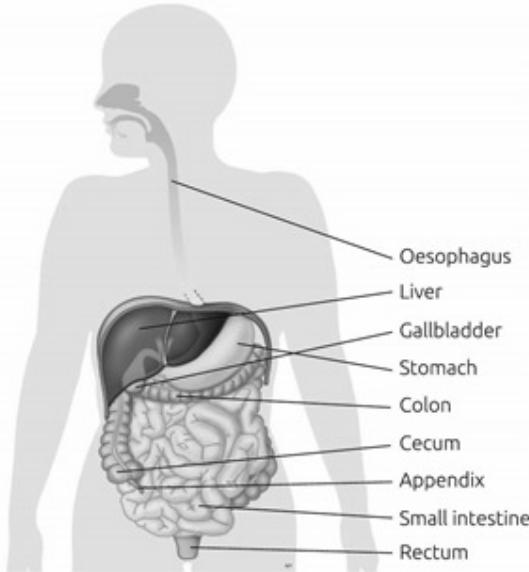
The pancreas secretes digestive enzymes into the duodenum, the first segment of the small intestine. These enzymes break down protein, fats, and carbohydrates. The pancreas also makes insulin, secreting it directly into the bloodstream. Insulin is the chief hormone for metabolizing sugar.

- Liver

The liver has multiple functions, but its main function within the digestive system is to process the nutrients absorbed from the small intestine. Bile from the gall bladder (liver) secreted into the small intestine also plays an important role in digesting fat. In addition, the liver is the body's "chemical factory." It takes the raw materials absorbed by the intestine and makes all the various chemicals the body needs to function. The liver also detoxifies potentially harmful substances. It breaks down and secretes many substances.

- Gallbladder

The gallbladder stores and concentrates bile, and then releases it into the duodenum to help absorb and digest fats.



- Large intestine (colon)

The *colon* is an approximately 1.5 meter (app. 60 inches) long muscular tube that connects the small intestine to the *rectum*. The large intestine is made up of the *cecum*, the *ascending* (right) *colon*, the *transverse* (across) *colon*, the *descending* (left) *colon*, and the *sigmoid colon*, which connects to the *rectum*. The *appendix* is a small tube attached to the *cecum*. The large intestine is a highly specialized organ that is responsible for processing waste so that emptying the bowels is easy and convenient.

Stool, or waste left over from the digestive process, is passed through the colon by means of peristalsis, first in a liquid state and ultimately in a semi-solid/solid form. As stool passes through the colon, water is removed. Stool is stored in the sigmoid (S-shaped) colon until a "mass movement" empties it into the rectum once or twice a day. It normally takes about 36 hours for stool to get through the colon. The stool itself is mostly food debris and bacteria. These bacteria perform several useful functions, such as synthesizing various vitamins, processing waste products and food particles, and protecting against harmful bacteria. When the descending colon becomes full of stool, also called *faeces*, it empties its contents into the rectum to begin the process of elimination.

- Rectum

The *rectum* is 18 to 20 cm (app. 8-inch) chamber that connects the colon to the *anus*. It is the rectum's job to receive stool from the colon, to let the person know that there is stool to be evacuated, and to hold the stool until evacuation happens. When anything (gas or stool) comes into the rectum, sensors send a message to the brain. The brain then decides if the rectal contents can be released or not. If they can, the sphincters relax and the rectum contracts, disposing of its contents. If the contents cannot be disposed of, the sphincter contracts and the rectum accommodates so that the sensation temporarily goes away.

- Anus

The *anus* is the last part of the digestive tract. It is a 3 to 5 cm (app 2-inch) long canal consisting of the pelvic floor muscles and the two anal sphincters (internal and external). The lining of the upper anus is specialized to detect rectal contents. It lets the person know whether the contents are liquid, gas, or solid. The anus is surrounded by sphincter muscles that are important in allowing control of stool movement. The pelvic floor muscles create

an angle between the rectum and the anus that stops stool from coming out when it is not supposed to. The internal sphincter is always tight, except when stool enters the rectum. It keeps us continent when we are asleep or otherwise unaware of the presence of stool. When we get an urge to go to the bathroom, we rely on our external sphincter to hold the stool until reaching a toilet, where it then relaxes to release the contents.

A well balanced diet contains carbohydrates, proteins, fat, minerals (ea. iron, calcium, sodium, potassium, magnesium, fluorine, iodine, zinc, copper etc.) and vitamins.

G.2 DIARRHOEA

Diarrhoea is the passage of three or more loose or liquid stools per day, or more frequently than is normal for the individual. It is usually a symptom of gastrointestinal infection, which can be caused by a variety of bacterial, viral and parasitic organisms.

A person can catch this infection by:

- drinking contaminated water;
- preparing food with contaminated water;
- eating unsafe food, such as fish that was caught in polluted water;
- food that has not been kept cold or has gone bad;
- touching faeces; or
- not washing his hands.

Diarrhoea causes dehydration as too much water and nutrition leaves the body. If the sick person does not receive help, he can die. Babies and children are most at risk of dehydration.

If both fever and diarrhoea occur together, laypersons often focus on fever only and not enough attention is paid to replacing lost fluids due to diarrhoea.

A sick person with diarrhoea does not normally need antibiotics, unless prescribed by a doctor.

G.2.1 WHAT DO I SEE AND ENQUIRE?

You may observe following signs and symptoms:

- The sick person has frequent loose or liquid stools.
- The sick person has an urgent need to defecate and might have trouble to keep it under control. Even after defecation person may complain of feeling of incomplete evacuation.
- Often the sick person complains about pain in the abdomen (cramps).
- The abdomen might appear bloated or tense.
- The sick person complains of feeling unwell.
- Fever might be present.
- There might be nausea and/or vomiting.
- The sick person might be passing blood and/or mucus in stool.

G.2.2 WHAT DO I DO?

G.2.2.1 HYGIENE

1. Wash your hands before taking care of the sick person. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.
2. Use gloves to protect yourself. If no gloves are available, you can use a clean plastic bag.

Try not to come in contact with the person's stool or vomit.

G.2.3 PREVENT DEHYDRATION



3. Prevent dehydration by giving plenty of fluids to the sick person. Ask the sick person to drink the equivalent of what he lost every time he passes loose stools:

On an average, a person should drink 5-10 ml/kg bodyweight per loose stool.



- a. Children under two years old should drink between a quarter and half of a large cup (50-100 ml) each time they pass loose stools.



- b. Children between 2-10 years should drink between a half and a full large cup (100-200 ml) each time they pass loose stools.



- c. Children above ten years and adults should at least drink one large cup (200 ml) each time they pass loose stools.



- d. Feed the sick child more frequently.

Tell the mother to continue to give breast feeding with a higher frequency.

Tell the mother to continue to give bottle feeding (for bottle-fed children only) with a higher frequency. Use the same milk as usual.

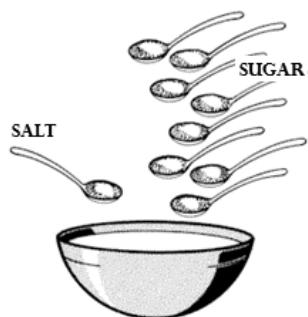


- 4. Advice the sick person to avoid fruit juices.



- 5. Let the sick person drink (if available) ORS (package bought at chemist or available at Govt. healthcare facilities free of cost).

Prepare and use as instructed on package.



6. If no ORS is available, you can prepare a homemade sugar and salt solution:
 - a. Take one litre of safe clean water (boiled and cooled cleanwater).
 - b. Add eight teaspoons of sugar.
 - c. Add one teaspoon of salt.
 - d. Mix well.
7. If the sick person also vomits, wait five to ten minutes before giving another drink. Then ask the person to drink slowly or give it by spoon.



8. You may give the sick person curd (if available).
9. The sick person can eat light food.
10. If a person has to travel, provide drinks so that he can take in fluids on the way.
11. Advise for regularly check on the sick person and to seek medical help if his condition worsens. This includes passing blood and mucus in stool, having fever, developing dehydration, or if diarrhoea does not get better within 2 days.

G.2.3.1 HYGIENE

Wash your hands after taking care of the sick person or if you came into contact with stools or vomit or you used the toilet. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

G.2.4 WHEN TO REFER TO A HEALTHCARE FACILITY?

- | The person should seek medical help if having any of the following symptoms:
- has blood in the stool,
 - has fever,

- suffers from severe sleepiness or is difficult to wake up or is confused,
- urinates less and the colour of the urine darkens,
- has sunken eyes,
- cries without tears,
- has a dry mouth,
- does not drink,
- has repeated vomiting,
- has fits,
- has fast breathing, or
- the diarrhoea does not get better within two days.

When transporting the person to a healthcare facility, provide drinks so that he can take in fluids on the way.

G.3 FOOD POISONING

Usually people loosely refer to all cases of gastroenteritis (vomiting, diarrhoea) caused by contaminated food as having food poisoning. Infectious organisms including viruses, bacteria and parasites are the most common causes of food poisoning. Contamination can occur at any point of production, processing, handling, storage, or cooking. The person may become sick in a few hours to several days after eating the contaminated food. These cases can be managed as other cases of diarrhoea.

Sometimes, food is directly contaminated by toxins, for example toxins released by *Staphylococci* or *Clostridium* bacteria. In such cases, the person usually becomes unwell very soon after consuming the food and the main symptom is vomiting. Some consider cases caused by food contaminated by a toxin as having true food poisoning. These cases need to be referred to the hospital urgently for proper management.

G.3.1 WHAT DO I SEE AND ENQUIRE?

You may observe following signs and symptoms:

- The sick person has nausea or vomits.
- The sick person complains about cramping and abdominal pain.
- The sick person has diarrhoea.
- The sick person might complain of a headache.
- There might be fever.
- The sick person might have impaired consciousness.

Several people sharing the contaminated food fall ill at the same time, as in a marriage.

G.3.2 WHAT DO I DO?

G.3.2.1 HYGIENE

1. Wash your hands before taking care of the sick person. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

Use gloves to protect yourself. If no gloves are available, you can use a clean plastic bag. Try not to come in contact with the person's vomit, stools or fluids.

G.3.2.2 PROVIDE FIRST AID



2. Advise the sick person to lie down and rest.



3. Prevent dehydration if the sick person suffers from vomiting and/or diarrhoea (see chapter on diarrhoea - What do I do?).
4. Observe the sick person; when his condition worsens, refer him to the nearest healthcare facility.

G.3.2.2.1 WHAT DO I DO WHEN THE PERSON BECOMES UNCONSCIOUS, BUT IS STILL BREATHING?

- a. Put the person in the recovery position.
- b. Continue to observe the patient's condition and breathing.

G.3.2.2.2 WHAT DO I DO WHEN THE PERSON STOPS BREATHING?

Perform CPR.

Do not interrupt the resuscitation until:

- the victim starts to wake up, moves, opens his eyes and breathes normally;
- help (trained in CPR) arrives and takes over; or
- you become too exhausted to continue.

G.3.2.3 HYGIENE

Always wash your hands after taking care of a person or after coming into contact with vomit, stools or other fluids. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

G.3.3 WHEN TO REFER TO A HEALTHCARE FACILITY?



Always urgently transport a person having food poisoning due to food contaminated with toxins or chemicals (Symptoms develop early) to the nearest healthcare facility.



When the person is considered having food poisoning due to food contaminated with organisms (toxins not released; the symptoms develop later) he should seek medical care if the condition worsens or he has any of the following symptoms:

- has blood or mucus in the diarrhoea,
- has fever,
- feeling sleepiness or is difficult to wake up or is confused,
- passing less urine and the colour of the urine darkens,

- has sunken eyes,
- cries without tears,
- has a dry mouth,
- does not drink,
- has repeated vomiting,
- has fits,
- has fast breathing,
- the diarrhoea does not get better within two days, or
- suffers impaired consciousness or blurred vision.

When transporting the person to a healthcare facility, provide drinks so that he can take in fluids on the way.

G.4 DIABETES

Diabetes is a condition that causes a person's blood sugar level to become high.

Many people have blood sugar levels above the normal range, but not high enough to be diagnosed as having diabetes. This condition is sometimes referred to as 'pre-diabetes'. If the blood sugar level is above the normal range, the risk of developing 'full-blown' diabetes is increased.

There are two main types of diabetes: type 1 diabetes and type 2 diabetes.

G.4.1 TYPE 1 DIABETES

In type 1 diabetes, the body's immune system attacks and destroys the cells that produce insulin. As no insulin is produced, the glucose level increases, which can seriously damage the body's organs. People diagnosed with type 1 diabetes need insulin injections for the rest of their life.

Type 1 diabetes is often known as *insulin-dependent diabetes*. It's also sometimes known as *juvenile diabetes* or *early-onset diabetes* when it develops in young persons, often during the teenage years.

Type 1 diabetes is less common than type 2 diabetes.

G.4.2 TYPE 2 DIABETES

Type 2 diabetes occurs when the body doesn't produce enough insulin, or the body's cells don't respond to insulin. This is known as *insulin resistance*.

Type 2 diabetes is far more common than type 1 diabetes.

People diagnosed with type 2 diabetes may be able to control the symptoms simply by eating a healthy diet, exercising regularly, and monitoring their blood glucose levels frequently.

However, as type 2 diabetes is a progressive condition, people diagnosed with type 2 diabetes may eventually need medication, usually in the form of tablets and/or injections.

Type 2 diabetes is often associated with obesity. It is sometimes referred to as *maturity-onset diabetes* because it's more common in older people.

G.4.3 GESTATIONAL DIABETES (DIABETES DURING PREGNANCY)

During pregnancy, some women have such high levels of blood glucose that their body is unable to produce enough insulin to convert it into energy. This is known as *gestational diabetes*.

Pregnancy can also make existing type 1 diabetes worse. Gestational diabetes can increase the risk of health problems developing in an unborn baby, so it's important to keep the blood glucose levels under control.

In most cases, gestational diabetes develops during the second trimester of pregnancy (weeks 14 to 26) and usually disappears after the baby is born. However, women who have gestational diabetes are at an increased risk of developing type 2 diabetes later in life.

G.4.4 DIAGNOSIS

It is very important for diabetes to be diagnosed as early as possible because it will get progressively worse if left untreated. Symptoms such as feeling thirsty, hungry and passing urine more often than usual, losing weight and muscle bulk, having wounds that heal slowly, experiencing blurred vision or feeling tired all the time might indicate a person suffers from diabetes and this person should contact a healthcare facility.

G.5 HYPERGLYCAEMIA

A too high level of blood sugar, called *hyperglycaemia* occurs when the body can't remove glucose from the blood and turn it into energy. It usually only happens in people with diabetes because people with this condition have problems with insulin – the hormone that helps remove glucose from the blood and converts it to energy.

If you have diabetes, there are some situations that can trigger an increase in blood glucose including infections, stress, missing a dose of insulin, eating too much or being ill.

G.5.1 SYMPTOMS OF HYPERGLYCAEMIC COMA OR DIABETIC COMA

Immediate medical attention is required if a person with diabetes, experiences the following symptoms:

- nausea or vomiting;
- stomach pain;
- a fruity smell on the breath, which may smell like pear drops or nail varnish;
- drowsiness or confusion;
- rapid breathing (hyperventilation);
- signs of dehydration (signs of which include a headache, dry skin, and a weak, rapid heartbeat);
- loss of consciousness.

These symptoms may be a sign of *diabetic ketoacidosis*, a serious and potentially life-threatening complication of hyperglycaemia.

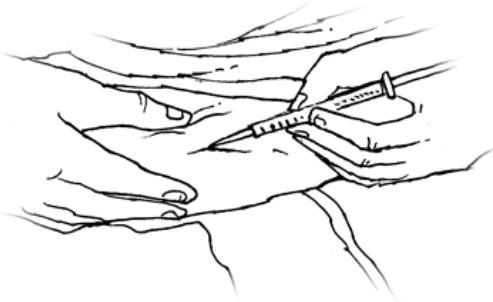
G.5.2 WHAT DO I DO?

G.5.2.1 SAFETY FIRST

1. Make sure there is no danger to you, the person or bystanders.

G.5.2.2 PROVIDE FIRST AID

2. The person urgently needs help. Shout or call for help if you are alone but do not leave the person unattended. Ask a bystander to seek help or to arrange urgent transport to the nearest healthcare facility or hospital. Tell him to come back to you to confirm if help has been secured.
3. Make the person lie down in a comfortable position.



4. Ask if the person is taking medicines for diabetes. If so, allow the person to take the prescribed medication.
5. Arrange urgent transport to a nearby healthcare facility.
6. Keep observing the person in case he collapses.

G.5.2.2.1 WHAT DO I DO WHEN THE PERSON BECOMES UNCONSCIOUS, BUT IS STILL BREATHING?

- a. Put the person in the recovery position.
- b. Continue to observe the patient's condition and breathing.

G.5.2.2.2 WHAT DO I DO WHEN THE PERSON STOPS BREATHING?

Perform CPR.

Do not interrupt the resuscitation until:

- the victim starts to wake up, moves, opens his eyes and breathes normally;
- help (trained in CPR) arrives and takes over;
- you become too exhausted to continue; or
- the scene becomes unsafe for you to continue.

G.5.2.3 HYGIENE

Always wash your hands after taking care of a person. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

G.5.3 WHEN TO REFER TO A HEALTHCARE FACILITY?

Always arrange urgent transport to the nearest healthcare facility as a diabetic coma is a serious and potentially life-threatening condition.

G.6 HYPOGLYCAEMIA

Hypoglycaemia, or also known as a "hypo", is an abnormally low level of sugar (glucose) in the blood. When the glucose level is too low, the body doesn't have enough energy to carry out its activities.

Hypoglycaemia is most commonly associated with diabetes and mainly occurs if someone with diabetes taking too much insulin (overdoses insulin) or other medicines, missing a meal or exercises too hard.

People who do not have diabetes can also experience hypoglycaemia, although this is much rarer. It can be triggered by malnutrition, binge drinking or certain other conditions.

G.6.1 SYMPTOMS OF HYPOGLYCAEMIA

Most people will have some warning that their blood glucose levels are too low, which gives them time to correct them. Typical early warning signs are feeling hungry, trembling or shakiness, dizziness, and sweating.

In more severe cases, there can also be confusion and difficulty in concentration. In severe cases, the person experiencing hypoglycaemia may lose consciousness.

It is also possible for hypoglycaemia to occur during sleep, which can cause excess sweating, disturbed sleep, and feeling tired and confused upon waking.

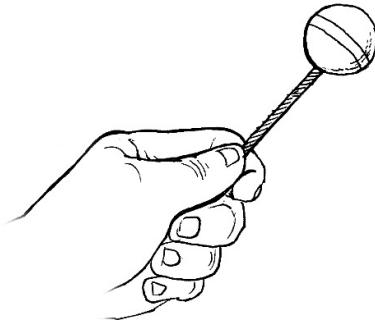
G.6.2 WHAT DO I DO?

G.6.2.1 SAFETY FIRST

1. Make sure there is no danger to you, the person or bystanders.

G.6.2.2 PROVIDE FIRST AID

2. Make the person lie down in a comfortable position.
3. Ask if the person is taking insulin and/or other medicines for diabetes and if he might have taken too much insulin and/or other medicines, missed a meal or have done a heavy physical exercise.



4. If the person is conscious and is able to follow commands and can swallow, give the sick person some food or drink that contains sugar, such as sweets, jam, or dextrose tablets or fruit juice.

Often the diabetic patient has fast acting sugars such as biscuits available with them. Allow him to take it.

After having something sugary, suggest the person to have a longer-acting "starchy" carbohydrate food, such as a few biscuits or a sandwich.

5. Never try to put food or drink into the mouth of someone who is drowsy or unconscious, as he could choke
6. Keep observing the person in case he collapses.
7. If you cannot differentiate between hyperglycaemia and hypoglycaemia (which is difficult even for a trained person), treat the patient as having hypoglycaemia. Low blood sugar can kill a person quickly.

G.6.2.2.1 WHAT DO I DO WHEN THE PERSON BECOMES UNCONSCIOUS, BUT IS STILL BREATHING?

- a. Put the person in the recovery position.
- b. Continue to observe the patient's condition and breathing.

G.6.2.2.2 WHAT DO I DO WHEN THE PERSON STOPS BREATHING?

Perform CPR.

Do not interrupt the resuscitation until:

- the victim starts to wake up, moves, opens his eyes and breathes normally;
- help (trained in CPR) arrives and takes over;
- you become too exhausted to continue; or
- the scene becomes unsafe for you to continue.

G.6.2.3 HYGIENE

Always wash your hands after taking care of a person. Use soap and water to wash your hands. If no soap is available, you can use ash to wash your hands. Alcohol-based sanitizers can also be used, if available.

G.6.3 WHEN TO REFER TO A HEALTHCARE FACILITY?



Always arrange urgent transport to the nearest healthcare facility as a diabetic coma is a serious and potentially life-threatening condition.



If the diabetic person experienced hypoglycaemia but improved with oral sugar, he should contact the healthcare facility to review his condition and eventually to correct his insulin doses and other medications.