Vital signs and monitoring

by Marie McCullagh & Ros Wright

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A Pre-reading

What do you understand by the term *vital signs*?

B Word building

1. Match the words to the definitions.

dehydrated	sedate	accessible	pulse	toddler
rhythm	anxiety	lesion	index	anterior

a. A _____ is an injury to a person's body or to an organ.
b. When something is easy to reach it is _____.
c. A _____ is a young child who has just learnt to walk.
d. A _____ is the regular beating of the heart, especially when it is felt on the wrist.
e. A continual state of fear and worry is called _____.
f. A _____ is a regular pattern of sounds or movement.
g. To _____ a person involves giving them a drug to make them sleepy.
h. The _____ finger is next to the thumb.
i. _____ means *at or towards the front of*.
j. When a person's body loses water, they become _____.

C Prefixes and suffixes

1. Match the prefixes or suffixes with the correct meaning.

-thermia	air / breathing
Cerebr-	beyond normal
a-	relating to the heart
hypo-	state of heat
cardio-	not
hyper-	an absence of / without
ab-	below normal
-pnea	relating to the brain

2. Find examples of the use of the prefix or suffix in the text.

3. Add any other examples you can think of.

D Comprehension check

1. Which of these statements do you think are true?

a. Slow breathing is normal during sleep.
b. Two factors should be observed when assessing a pulse: the rate and the rhythm.
c. Fever can cause a fast heart rate.
d. A fit athletic person can have a slow heart rate.
e. A strong pulse can indicate dehydration.

Now read the text below and check your answers. Write T (True) or F (False) next to each of the statements.

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Vital signs are measurements of the body's most basic functions. There are four main vital signs commonly used by health practitioners:

1. Respiratory rate
2. Pulse rate
3. Blood pressure
4. Body temperature

1. Respiratory rate is the number of breaths recorded in one minute without the client's knowledge while he is at rest. Respiratory rate can be assessed by sitting at the patient's right side and taking the pulse in their left wrist while laying their hand on their upper abdominal area. Normal resting respiratory rates for adults range from 15–20 breaths per minute and 20–25 breaths per minute for children between 5–12 years old. However, in certain conditions, abnormalities of the rate of breathing may occur:

- **Bradypnoea** is abnormally slow breathing. It is a normal phenomenon during sleep but in ill-health may indicate oversedation, opiate poisoning or the presence of a cerebral lesion.
- **Tachypnoea** is abnormally fast breathing.
- **Apnoea** occurs when breathing stops temporarily.

When you have completed this observation, keep hold of the wrist as if you were still counting the pulse; you can then feel the chest or abdomen moving against your hand.

2. Pulse rate

The heart rate is most commonly assessed by calculating the pulse rate, which is the number of beats in a 60-second period. The pulse is detected by placing two fingers over an artery close to a bony or firm surface. The most common site used for pulse rate detection in adults and children over the age of two years is the radial pulse because it is one of the most easily detected and accessible sites. This can be felt on the anterior aspect of the wrist. The arm should be supported and relaxed and the palm rotated uppermost. The pulse should be felt with the index and middle fingers over the groove along the thumb side of the inner wrist. Toddlers may need distracting to ensure accurate counting of the pulse.

Normal heart rates for children and adults are shown here:

Age (years)	Heart rate (beats per minute)
<1	110–160
1–2	100–150
2–5	95–140
5–12	80–120
12–adult	60–100

When assessing a person's pulse, three factors should be observed: its rate, rhythm and strength. A heart rate faster than the normal values shown in the table is known as a *tachycardia*. In adults this is considered to occur when the heart rate is over 100 beats per minute. Causes of an increased rate include exercise, stress, fear, excitement, fever or blood or fluid loss, certain drugs and heart conditions. A heart rate slower than the normal values show in the table is known as a *bradycardia*. In adults, this is considered to occur when the heart rate is less than 60 beats per minute. Causes

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of a slow heart rate include hypothermia, certain drugs, for example beta-blockers and certain heart conditions. However, a slow heart rate may also be a normal finding in fit athletic individuals.

The accurate recording and reporting of an abnormally fast or slow heart rate is essential. It will often indicate a sudden change in a person's condition that needs to be further assessed and possibly treated. The rhythm of the pulse is the pattern in which the beats occur. In a healthy person, the pattern or rhythm is regular because the chambers of the heart are contracting in a co-ordinated manner, producing a regular pulse beat.

The strength or volume of the pulse is important because it can provide an indication of the person's cardiac function, cardiac output and probable blood pressure. A pulse that is weak and difficult to feel will usually be rapid and may disappear when pressure is applied to the artery, suggesting that the patient is dehydrated, bleeding or exhausted. A strong and pounding pulse may be the result of infection, stress anaemia or exercise.

3. Blood pressure

A routine component of the cardiovascular assessment is the measurement and recording of blood pressure which is the pressure exerted by the blood on the walls of a blood vessel. The maximum pressure is known as the systolic pressure and the minimum pressure that occurs during relaxation of the heart is known as the diastolic pressure. The most frequent, non-invasive method of measuring arterial blood pressure employs a sphygmomaometer. The frequency of recording will depend on the patient's condition, the reason for admission and the results of the reading. It is therefore essential that the technique is performed accurately, on the same arm each time, and that the patient is prepared prior to the procedure.

The effects of anxiety should also be considered, and ideally patients should be as relaxed as possible prior to a blood pressure recording. However, it is notable that in some groups of patients, a phenomenon known as 'white coat hypertension' or the 'white coat effect' can occur. In these circumstances, anxiety relating to an anticipated recording of results is a stress effect that artificially raises the blood pressure.

4. Temperature

Normal body temperature can range from 36.5°C to 37.2°C. Body temperature may be abnormal due to fever (high temperature) or hypothermia (low temperature). A fever is indicated when body temperature rises above 38.5°C.

Adapted from *Foundations of Nursing Practice* (3rd Edition), edited by Richard Hogston and Barbara A. Marjoram: Palgrave Macmillan (2008). Reproduced with permission from Palgrave Macmillan.

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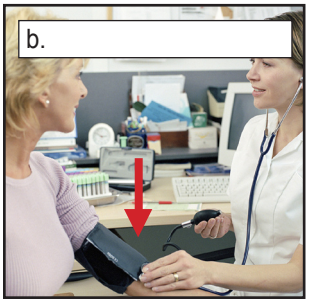
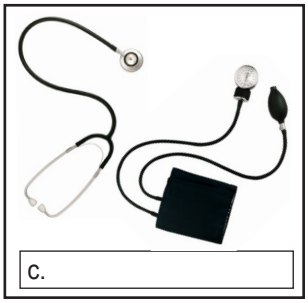
E Vocabulary development

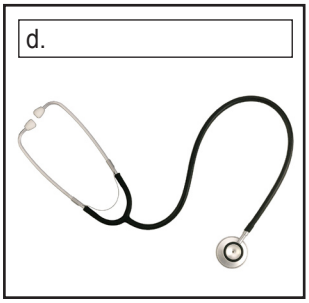
1. Match the words in the box with the instruments in pictures a–d.

blood pressure cuff | sphygmomanometer | stethoscope | thermometer


a.

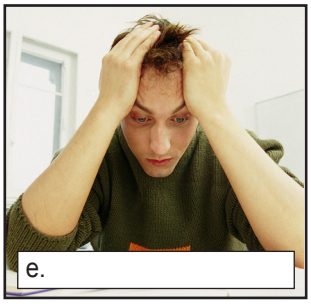

b.

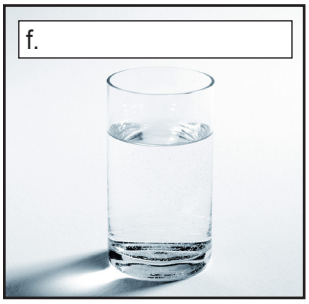

c.


d.

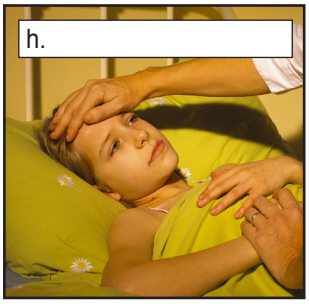
2. Match the words in the box with the conditions in pictures e-h.

dehydration | fever | hypothermia | stress


e.


f.


g.


h.

F Discussion

The measurement of some vital signs can be influenced by psychological factors. Which of the vital signs do you think are likely to be influenced in this way? What can be done to minimize these effects?

G Follow-up

Using reference books or the Internet, find out what different types of thermometer can be used to take a patient's temperature. Which parts of the body can temperature measurements be taken from and which of the types of thermometer can be used for each?

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ANSWER KEY

A Pre-reading

The vital signs are commonly regarded as respiratory rate, pulse rate, blood pressure and body temperature.

B Word-building

1.
a. lesion
b. accessible
c. toddler
d. pulse
e. anxiety
f. rhythm
g. sedate
h. index
i. anterior
j. dehydrated

C Prefixes and suffixes

1.	*-thermia*	state of heat	*hypothermia*
2.	*cerebr-*	relating to the brain	*cerebral*
3.	*a-*	an absence of / without	*apnoea*
4.	*hypo-*	below normal	*hypothermia*
5.	*cardio-*	relating to the heart	*cardiac, tachycardia, bradycardia, cardiovascular*
6.	*hyper-*	beyond normal	*hypertension*
7.	*ab-*	not	*abnormalities, abnormally, abnormal*
8.	*-pnea*	air / breathing	*bradypnoea, tachypnoea, apnoea*

D Comprehension check

1.
a. T
b. F (the strength of the pulse is another important factor)
c. T
d. T
e. F (it indicates a weak pulse)

E Vocabulary development

1.
a. thermometer
b. blood pressure cuff
c. sphygmomanometer
d. stethoscope
e. stress
f. dehydration
g. hypothermia
h. fever

F Discussion

Breathing and blood pressure are the two most likely to be influenced by psychological factors. To minimize the possibility of a patient changing their breathing when being measured, the measurement of breathing can be carried out without the patient being aware of it, as in the instructions in the text. White coat hypertension can be countered by carrying out measurements in as stress free an environment as possible, by having patients take their own measurements or by using telemonitoring to take the patients' blood pressure remotely.

G Follow up

Glass, paper or electronic thermometers can be used.

- Oral – glass, paper, or electronic
- Under arm (axillary) – glass or electronic
- Rectal – glass or electronic
- Aural (the ear) – electronic