



Belgian  
Red Cross

# Help! First aid for everyone

## Guideline

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Evidence-based  
by CEBaP

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# Resuscitation and defibrillation

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# 1. What is it?

Blood transports oxygen to all the organs. Oxygen is extremely important for the body. A shortage of oxygen (hypoxia) will very quickly result in physical damage. The brain is particularly susceptible in the event of a lack of oxygen. Normally speaking, brain cells cannot function longer than a few minutes without oxygen before sustaining irreparable damage. It is the job of the heart to pump blood around the body via the arteries. If the heart stops pumping, the blood will stop circulating and the result is what we call cardiac or circulatory arrest. Sudden Cardiac Arrest or SCA is one of the main causes of death in Europe. Cardiac arrest is often caused by a problem in the heart itself, but can also be the result of drowning or asphyxia, for example. In the event of cardiac arrest, there is a shortage of oxygen in all the (vital) organs. Someone suffering from cardiac arrest will rapidly lose consciousness, then stop breathing and eventually dies.

## 1.1 Combination of techniques

For the reasons outlined above, bystanders should immediately start resuscitation, including early defibrillation. The chances of surviving a cardiac arrest are small, but they increase considerably if bystanders act immediately.

Resuscitation is a combination of chest compressions (giving heart massage) and rescue breaths (for example, giving mouth-to-mouth resuscitation). To ensure successful resuscitation, it is essential to give chest compressions as well as rescue breaths. In an ideal situation you can combine resuscitation with the use of an automated external defibrillator (AED). This device gives an electric shock to the ill person, when necessary. This will increase the chance of the heart pumping normally again. The use of an AED significantly increases the success rate of resuscitation.

## 1.2 The chain of survival

The chain of survival describes the vital steps necessary for the successful resuscitation of a person suffering from cardiac arrest.

### 1. Early recognition and call for help

If you observe the symptoms of a heart problem in time (for example, a victim with chest pain) you may be able to alert the emergency services, even before cardiac arrest has occurred. This will increase the chance of survival. It is also important to correctly assess the condition of the ill person when cardiac arrest has already occurred. In this case, that includes observing that the ill person is not responding and is not breathing normally. (EB<sup>1</sup>) It is important to act quickly after establishing this: bystanders should instantly alert the emergency services and start resuscitation.

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<sup>1</sup> ERC 2010 BLS-003A & BLS-003B: Initial recognition: It is reasonable that lay rescuers and healthcare professionals use the combination of unresponsiveness and absent or abnormal breathing to identify cardiac arrest. Palpation of the pulse as the sole indicator of the presence or absence of cardiac arrest is unreliable. Agonal gasps are common during cardiac arrest and should not be considered normal breathing.

## **2. Early resuscitation by bystanders**

When you call the emergency services on 112 and report that a person is not responding and not breathing normally, the operator will instantly suspect cardiac arrest (EB<sup>2</sup>, strong recommendation, very low quality evidence). By immediately starting resuscitation (also called cardiopulmonary resuscitation or CPR), you can double or even quadruple the chances of survival from cardiac arrest. First aiders should give chest compressions, in combination with rescue breaths (EB<sup>3</sup>, weak recommendation, very low quality evidence; EB<sup>4</sup>, weak recommendation, low quality evidence). If the bystander who alerts the emergency services has no knowledge of first aid, the operator at the 112 help centre will instruct him to give chest compressions only, without rescue breaths (EB<sup>5</sup>, strong recommendation, very low quality evidence), while awaiting the arrival of specialised emergency personnel. We call this assisted CPR, telephone CPR, or phone CPR. This increases the person's chances of survival, because the time until the first chest compression is reduced and the number of chest compressions given is increased. The operator gives resuscitation instructions over the phone for all cases of a suspected cardiac arrest, unless a trained first aider is already carrying out resuscitation. For an adult victim the operator from the 112 help centre will only give instructions for administering chest compressions (EB<sup>6</sup>, strong recommendation, low quality evidence). If the injured person is a child, the operator will give instructions for administering both rescue breaths and chest compressions.

## **3. Early defibrillation**

Defibrillation, within 3 to 5 minutes after the onset of cardiac arrest, can increase the ill person's survival chances by 50 to 70%. On average, 5 to 8 minutes pass between alarming the emergency services and their arrival (we also call this response the time or response interval), or 8 to 11 minutes until the administration of the first electric shock using an automated external defibrillator (AED). In that time period, therefore, the ill person's survival chances depend on bystanders quickly starting resuscitation and using an AED. It is therefore important that there are enough AEDs accessible.

## **4. Early advanced life support and standard post resuscitation care**

After resuscitation has been started, it is essential for specialised emergency staff to take over and manage the airway, and to use medication and specialist equipment.

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<sup>2</sup> ERC 2015 BLS 740: Dispatcher recognition of cardiac arrest: We recommend that dispatchers determine if a patient is unconscious with abnormal breathing. If the injured person is unconscious with abnormal or absent breathing, it is reasonable to assume that the patient is in cardiac arrest at the time of the call.

We recommend that dispatchers be educated to identify unconsciousness with abnormal breathing. This education should include recognition and significance of agonal breaths across a range of clinical presentations and descriptions.

<sup>3</sup> ERC 2015 BLS 372: Chest compression-only CPR versus conventional CPR: We suggest that those who are trained and willing to give rescue breaths do so for all adult patients in cardiac arrest.

<sup>4</sup> ERC 2015 Peds 414: Chest compression-only CPR versus conventional CPR: We recommend that rescuers provide rescue breaths and chest compressions for paediatric in-hospital cardiac arrest and out-of-hospital cardiac arrest. If rescuers cannot provide rescue breaths, they should at least perform chest compressions.

<sup>5</sup> ERC 2015 BLS 372: Chest compression-only CPR versus conventional CPR: We recommend that chest compressions should be performed for all patients in cardiac arrest.

<sup>6</sup> ERC 2015 BLS 359: We recommend that dispatchers provide chest compression-only CPR instructions to callers for adults with suspected out-of-hospital cardiac arrest.

## 1.3 Recognising cardiac arrest

Sometimes it can be difficult to recognise cardiac arrest. Both bystanders and operators at the 112 help centre must recognise cardiac arrest quickly so as to activate the chain of survival (EB<sup>7</sup>, strong recommendation, very low quality evidence). Feeling for the pulse at the wrist or neck is not an accurate or suitable method for determining the presence or absence of circulation (EB<sup>8</sup>). You must consider the possibility of cardiac arrest (and then start resuscitation) if the person **does not respond and is not breathing normally** (EB<sup>9</sup>).

In the first few minutes following cardiac arrest the person might not be breathing much at all or irregularly, infrequently, slowly, or loudly gasping for breath. It then looks as though the ill person is still trying to breathe. He makes (sometimes loud) respiratory movements, but you cannot feel an air flow around the nose and mouth. This is known as agonal breathing or gasping. Gasping is not normal breathing, but is a sign of cardiac arrest. This occurs in approximately 40% of cases within the first few minutes of cardiac arrest. Resuscitation should be started immediately in the event of agonal breathing (EB<sup>9</sup>). Many bystanders confuse this with normal breathing. If you recognise this as a sign of cardiac arrest and start resuscitation, you will increase the ill person's chances of survival.

It is also possible that the ill person will make involuntary movements with the arms and legs.

In summary, resuscitation is positioned as follows in the four-step plan for approaching an ill person:

1. Make the area safe		
2. Assess the condition of the ill or injured person		
The ill person is conscious.	The ill person is unconscious and is breathing normally.	The ill person is unconscious and is not breathing (normally).
3. Seek help from a specialist		
Seek help from a specialist if necessary.	Call the emergency services on 112.	Call the emergency services on 112.
4. Administer further first aid		
	Put the ill person in the recovery position provided there is no suspicion of a spinal injury.	Start resuscitation and defibrillation.

<sup>7</sup> ERC 2015 BLS 740: Dispatcher recognition of cardiac arrest: We recommend that dispatchers determine if a patient is unconscious with abnormal breathing. If the injured person is unconscious with abnormal or absent breathing, it is reasonable to assume that the patient is in cardiac arrest at the time of the call.

We recommend that dispatchers be educated to identify unconsciousness with abnormal breathing. This education should include recognition and significance of agonal breaths across a range of clinical presentations and descriptions.

<sup>8</sup> ERC 2015 BLS 348: Check for circulation during BLS: Outside of the advanced life support environment where invasive monitoring is available, there is insufficient data around the value of a pulse check while performing CPR.

We therefore do not make a treatment recommendation regarding the value of a pulse check.

Agonal gasps are common during cardiac arrest and should not be considered normal breathing.

<sup>9</sup> ERC 2010 BLS-003A & BLS-003B: Initial recognition: It is reasonable that lay rescuers and healthcare professionals use the combination of unresponsiveness and absent or abnormal breathing to identify cardiac arrest. Palpation of the pulse as the sole indicator of the presence or absence of cardiac arrest is unreliable.

## 2. Resuscitation

As stated earlier, resuscitation consists of a combination of chest compressions and rescue breaths. People who have had no first aid training (laypeople) and who are confronted with a person who is suffering from cardiac arrest will be asked by the operator when calling the 112 emergency number to carry out chest compressions only. The operator will give instructions over the phone (EB<sup>10</sup>, strong recommendation, low quality evidence). It is difficult for them to give effective mouth-to-mouth resuscitation without prior training.

In the event that the ill person turned out not to be suffering from cardiac arrest, resuscitation carried out by bystanders very rarely gives rise to serious harm. Therefore, do not hesitate to start resuscitation for fear of causing harm (EB<sup>11</sup>, strong recommendation, very low quality evidence).

If you do have to resuscitate, give 30 chest compressions (EB<sup>12</sup>, strong recommendation, very low quality evidence), followed by 2 rescue breaths (EB<sup>13</sup>, weak recommendation, very low quality evidence; EB<sup>14</sup>, weak recommendation, low quality evidence). Also use an automated external defibrillator (AED) if available (see Defibrillation).

### 2.1 Chest compressions

Heart massage means **giving chest compressions**. This consists of pressing on the sternum (EB<sup>15</sup>, weak recommendation, very low quality evidence), which increases the pressure in the chest cavity. Blood is then pushed out of the heart. This generates a small but very important transport of blood to the vital organs.

For adults requiring being resuscitated, it is highly probably that the cardiac arrest is the result of a heart problem (cardiac origin). When the blood stops circulating after cardiac arrest, the blood in the bloodstream has enough oxygen for a few more minutes. This is why it is paramount to give chest compressions. Start resuscitation with chest compressions (EB<sup>12</sup>, strong recommendation, very low quality evidence), and only then give rescue breaths (EB<sup>13</sup>, weak recommendation, very low quality evidence).

It is best to let one first aider kneel beside the ill person and administer the chest compressions. This will ensure that there is minimal interruption between chest compressions and rescue breaths. It is possible to use a technique whereby resuscitation is carried out over the head (one first aider) or astride the person (two first aiders) in situations where it is not possible to kneel next to the ill person, for example if the person is situated in a cramped space.

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<sup>10</sup> ERC 2015 BLS 359: Dispatcher instructions: We recommend that dispatchers provide chest compression-only CPR instructions to callers for adults with suspected out-of-hospital cardiac arrest.

<sup>11</sup> ERC 2015 BLS 353: Harm from CPR to victims not in cardiac arrest: We recommend that laypersons initiate CPR for presumed cardiac arrest without concerns of harm to patients not in cardiac arrest.

<sup>12</sup> ERC 2015 BLS 372: Chest compression-only CPR versus conventional CPR: We recommend that chest compressions should be performed for all patients in cardiac arrest.

<sup>13</sup> ERC 2015 BLS 661: Starting CPR: We suggest commencing CPR with compressions rather than ventilations.

<sup>14</sup> ERC 2015 BLS 362: Compression–ventilation ratio: We suggest a compression–ventilation ratio of 30:2 compared with any other compression–ventilation ratio in patients in cardiac arrest.

<sup>15</sup> ERC 2015 BLS 357: Hand position during compressions: We suggest performing chest compressions on the lower half of the sternum on adults in cardiac arrest.

Ensure that the ill person is lying on his back, on a firm surface. Deflate any air mattress present during resuscitation, or if necessary place the ill person on the ground (EB<sup>16</sup>).

In summary, give chest compressions as follows:

1. Place the hands in the middle of the chest (EB<sup>17</sup>, weak recommendation, very low quality evidence). Lock the fingers of both your hands together.
2. Compress the chest of an average adult by approximately 5 cm (EB<sup>18</sup>, strong recommendation, low quality evidence), but no more than 6 cm (EB<sup>19</sup>, weak recommendation, low quality evidence).
3. Compress the chest at a frequency of 100 to 120 compressions per minute (EB<sup>20</sup>, strong recommendation, very low quality evidence), with as few pauses as possible.
4. Allow the chest to rise again after each compression. Do not lean on the chest (EB<sup>21</sup>, strong recommendation, very low quality evidence).

You will achieve the best response if the chest compressions are administered on the lower half of the sternum. To do this, place the heel of one hand **in the centre of the chest** (EB<sup>22</sup>, weak recommendation, very low quality evidence) and place the other hand on top. Lock the fingers of both your hands together. The chest compressions must go **sufficiently deep**. In order to give effective chest compressions to an adult of average height, compress the chest by approximately 5 cm deep (EB<sup>18</sup>, strong recommendation, low quality evidence) (but not more than 6 cm) (EB<sup>19</sup>, weak recommendation, low quality evidence). For children, compress the chest by at least a third of its depth: (EB<sup>23</sup>, weak recommendation, very low quality evidence)

- + Compress the chest of a child by 5 cm.
- + Compress the chest of a baby by 4 cm.

Give the chest compressions at a **rate** of 100 to 120 compressions per minute (EB<sup>24</sup>, strong recommendation, very low quality evidence). The time required for compressing the chest and the time required for letting it inflate again must be of equal length (EB<sup>25</sup>).

Allow the chest wall to fully recoil after each compression. Only when you allow the chest to rise completely again, can the heart fill up with blood again. Keep the pauses between chest compressions

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<sup>16</sup> ERC 2010 BLS-035A & BLS-035B: Firm surface for chest compressions: CPR should be performed on a firm surface when possible. Airfilled mattresses should be routinely deflated during CPR.

<sup>17</sup> ERC 2015 BLS 357: Hand position during compressions: We suggest performing chest compressions on the lower half of the sternum on adults in cardiac arrest.

<sup>18</sup> ERC 2015 BLS 366: Chest compression depth: We recommend a chest compression depth of approximately 5 cm (2 in.) during manual CPR.

<sup>19</sup> ERC 2015 BLS 366: Chest compression depth: We recommend avoiding excessive chest compression depths (greater than 6 cm [greater than 2.4 in.] in an average adult) during manual CPR.

<sup>20</sup> ERC 2015 BLS 343: Chest compression rate: We recommend a manual chest compression rate of 100–120/min.

<sup>21</sup> ERC 2015 BLS 367: Chest wall recoil: We suggest that rescuers performing manual CPR avoid leaning on the chest between compressions to allow full chest wall recoil.

<sup>22</sup> ERC 2015 BLS 357: Hand position during compressions: We suggest performing chest compressions on the lower half of the sternum on adults in cardiac arrest.

<sup>23</sup> ERC 2015 Peds 394: Chest compression depth: We suggest that rescuers compress the chests of infants by at least one third the anterior–posterior dimension, or approximately 1½" (4 cm). We suggest that rescuers compress the child's chest by at least one third of the anterior–posterior dimension, or approximately 2" (5 cm).

<sup>24</sup> ERC 2015 BLS 343: Chest compression rate: We recommend a manual chest compression rate of 100–120/min.

<sup>25</sup> ILCOR 2005 W167C: Chest compression rate, depth, decompression, and duty cycle: It is reasonable to use a duty cycle (i.e. ratio between compression and release) of 50%.

to a minimum (for example, before and after a defibrillation shock). Do not lean on the chest (EB<sup>26</sup>, weak recommendation, very low quality evidence).

- + Give chest compressions on a bare chest if possible. It is easier to see where to place your hands when you can see how the body is constructed. In an ideal situation an AED will quickly be available. Stick the electrodes to a bare chest (EB<sup>27</sup>). So as not to lose time or interrupt the chest compressions unnecessarily, it is recommended to undo clothing on the upper body right at the start.
- + The AED asks you every two minutes not to touch the person. This is so that the AED can re-assess the heart rhythm and administer a shock if necessary.

If you have to use heart massage on a child, use the same technique as for an adult, taking into account the following changes:

- + Compress the chest by at least a third of its depth (4 cm for babies, 5 cm for children) (EB<sup>28</sup>, weak recommendation, very low quality evidence).
- + If the ill person is a baby (a child younger than 1 year), use two fingers to carry out the chest compressions. If you are the only first aider present, compress the chest with two finger tips next to each other. If there are two or more first aiders, the circumferential technique is recommended. This involves placing both thumbs flat next to each other on the upper half of the sternum, with the tips aimed at the baby's head. Spread both hands with closed fingers around the lower part of the chest. The fingers should support the baby's back (EB<sup>29</sup>).
- + If the child is older than 1 year, use one or two hands, depending on what is required to reach sufficient compression depth (in bigger children or small first aiders this is easier to do using both hands, with the fingers locked together) (EB<sup>30</sup>).
- + For people with a duty to respond in paediatric emergencies (usually health professionals, such as staff at a crèche): after 15 chest compressions tilt the head back, lift the chin up and give 2 effective rescue breaths. Continue with the chest compressions and rescue breaths in a ratio of 15 compressions to 2 rescue breaths. (EB<sup>31</sup>)

Other first aiders should, for the sake of simplicity, use the ratio of 30 chest compressions to 2 rescue breaths, as with adults (EB<sup>31</sup>; EB<sup>32</sup>, strong recommendation, low quality evidence).

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<sup>26</sup> ERC 2015 BLS 367: Chest wall recoil: We suggest that rescuers performing manual CPR avoid leaning on the chest between compressions to allow full chest wall recoil.

<sup>27</sup> ERC 2010 ALS-E-030A: Placement of paddles/pads: It is reasonable to place paddles/pads on the exposed chest in an anterior-lateral position.

<sup>28</sup> ERC 2015 Peds 394: Chest compression depth: We suggest that rescuers compress the chests of infants by at least one third the anterior–posterior dimension, or approximately 1½" (4 cm). We suggest that rescuers compress the child's chest by at least one third of the anterior–posterior dimension, or approximately 2" (5 cm).

<sup>29</sup> ILCOR 2005 W9B: Circumferential versus two-finger chest compressions: The two thumbencircling hands chest compression technique with thoracic squeeze is the preferred technique for two-rescuer infant CPR. The twofinger technique is recommended for one-rescuer infant CPR to facilitate rapid transition between compression and ventilation to minimise interruptions in chest compressions. It remains an acceptable alternative method of chest compressions for two rescuers.

<sup>30</sup> ERC 2010 Peds-033: One- versus two-hand chest compression in children: Either a one- or two-hand technique can be used for performing chest compressions in children.

<sup>31</sup> ERC 2010 Peds-011B: Optimal compression-ventilation ratio for infants and children: For ease of teaching and retention, a compression–ventilation ratio of 30:2 is recommended for the lone rescuer performing CPR in infants and children, as is used for adults. For healthcare providers performing two-rescuer CPR in infants and children, a compression–ventilation ratio of 15:2 is recommended.

<sup>32</sup> ERC 2015 Peds 414: Chest compression-only CPR versus conventional CPR: We recommend that rescuers provide rescue breaths and chest compressions for paediatric in-hospital cardiac arrest and out-of-hospital cardiac arrest. If rescuers cannot provide rescue breaths, they should at least perform chest compressions.

## 2.2 Rescue breaths

Rescue breaths supply the circulating blood with sufficient oxygen. For rescue breaths to be effective, it is important that the airway is open. You can ventilate someone suffering from cardiac arrest using **mouth-to-mouth resuscitation**, but you can also use a **pocket mask**. There is often a pocket mask included with an AED. Using this tool, you can avoid direct mouth-to-mouth contact with the ill person. A pocket mask can also protect you and the ill person from infection and chemical products. Make sure that you don't waste time putting on the pocket mask. While giving chest compressions, leave the mask on the ill person's face so you can quickly alternate between rescue breaths and chest compressions. Specialist emergency staff use other tools to give effective rescue breaths (for example, a bag valve mask).

There is no risk of infection from giving chest compressions. When giving mouth-to-mouth resuscitation however, there is a (very small) risk of infecting the ill person (or vice versa). This may for instance be the case if you have a cold or the flu.

A face shield is a plastic and usually transparent cover that prevents direct contact between the first aider's mouth and that of the ill person during mouth-to-mouth resuscitation (see Face Shield). This offers a certain degree of protection during mouth-to-mouth resuscitation. However, there is no guarantee. A pocket mask (see Pocket mask) is more effective and offers better protection against infection. In addition, the quality of the mouth-to-mouth resuscitation with a pocket mask is much better, and there are fewer interruptions. The use of a face shield is therefore not the preferred method.

To ensure that the chest rises visibly, you will need to blow in 500 to 600 millilitres of air (tidal volume). This is of course difficult to measure. As a first aider, you will therefore have to aim for a rescue breath time of approximately 1 second, with sufficient volume to make the ill person's chest to rise. Avoid fast or forceful rescue breaths. (EB<sup>33</sup>)

Do not interrupt chest compressions for longer than 10 seconds to give 2 rescue breaths (EB<sup>34</sup>, weak recommendation, low quality evidence). After giving two rescue breaths, place your hands immediately in the right position on the sternum and give another 30 chest compressions (EB<sup>35</sup>, weak recommendation, low quality evidence). Do this even if your rescue breaths are not successful. Make 2 attempts each time to blow in air. Do not continue trying, but instead continue with 30 chest compressions and then try again to give 2 effective rescue breaths. After the first rescue breath, remove your mouth from the ill person's and see if the chest falls again when the air escapes. Then, breathe in again and blow air into the ill person's mouth once more.

- + Try and avoid fast or forceful rescue breaths.
- + If the chest does not rise, air might be escaping, or the ill person's head might not be tilted back sufficiently or there may be a foreign object obstructing the airway.
  - o Open the ill person's mouth and look for any visible objects blocking the airway. If you see an object, try and remove it in one attempt with your fingers (EB<sup>36</sup>). Do not make any

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<sup>33</sup> ERC 2010 BLS-052B: Tidal volumes and ventilation rates: For mouth-to-mouth ventilation for adult victims using exhaled air or bag-mask ventilation with room air or oxygen, it is reasonable to give each breath within a 1-s inspiratory time and with an approximate volume of 600mL to achieve chest rise. It is reasonable to use the same initial tidal volume and rate in patients regardless of the cause of the cardiac arrest.

<sup>34</sup> ERC 2015 BLS 358: Minimizing pauses in chest compressions: We suggest that in adult patients receiving CPR with no advanced airway, the interruption of chest compressions for delivery of 2 breaths should be less than 10 s.

<sup>35</sup> ERC 2015 BLS 362: Compression-ventilation ratio: We suggest a compression-ventilation ratio of 30:2 compared with any other compression-ventilation ratio in patients in cardiac arrest.

<sup>36</sup> ERC 2010 BLS-013A: Foreign-body airway obstruction: The finger sweep may be used in the unconscious patient with an obstructed airway if solid material is visible in the airway.

blind or repeated attempts to remove the object. You may force the object deeper into the throat and cause injury.

- Place your mouth again over the ill person's mouth, tilt the head back sufficiently and blow air in again.
- + In some people the larynx and vocal chords have been removed during an operation. This is usually the result of a mass in that location. The trachea is then connected with an artificial opening in the neck. We call this a tracheostomy (neck stoma or breathing stoma). If a person with a neck stoma has to be resuscitated, you cannot use rescue breaths. This is because there is no longer a connection between the oral cavity and the trachea. Rescue breaths must therefore be given via the neck stoma (EB<sup>37</sup>). There is a chance that you will hear air flowing through the mouth while giving rescue breaths.
- + If there are several first aiders, alternate every 2 minutes (after approximately 8 cycles).
- + Laypeople must use chest compressions on a victim who has suffered cardiac arrest (EB<sup>38</sup>, strong recommendation, very low quality evidence). First aiders trained and competent in giving rescue breaths should give chest compressions and rescue breaths, since this will increase the ill person's survival chances (EB<sup>39</sup>, weak recommendation, very low quality evidence; EB<sup>40</sup>, strong recommendation, low quality evidence). If you really do not want to give mouth-to-mouth resuscitation (for example, if the injured person is bleeding badly or has vomited), then it is always better to give chest compressions only than to do nothing. Even if you resuscitate without ventilating, the person's survival chances will increase.
- + Give a person involved in a drowning incident 5 rescue breaths before starting with chest compressions. Thereafter use the ratio of 30 chest compressions to 2 rescue breaths.

### What do you see?

- + The ill person is not responding.
- + He is unconscious.

### This is what you should do!

1. Make the area safe
  - + Ensure that the area is safe for you, the ill person and the bystanders.
2. Assess the condition of the ill person
  - + Check what is wrong with the ill person.
  - + Check whether the ill person is conscious.
  - + Open the airway and check the ill person's breathing (EB<sup>41</sup>).
  - + Shout loudly for help if you have ascertained that the ill person is unconscious and you are alone, or pick someone out from a group of bystanders to help you. Do this so that you are not alone when providing first aid.

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<sup>37</sup> ILCOR 2005 W158B: Mouth-to-tracheal stoma ventilation: It is reasonable to perform mouth-to-stoma breathing or to use a wellsealing, round paediatric face mask.

<sup>38</sup> ERC 2015 BLS 372: Chest compression-only CPR versus conventional CPR: We recommend that chest compressions should be performed for all patients in cardiac arrest.

<sup>39</sup> ERC 2015 BLS 372: Chest compression-only CPR versus conventional CPR: We suggest that those who are trained and willing to give rescue breaths do so for all adult patients in cardiac arrest.

<sup>40</sup> ERC 2015 Peds 414: Chest compression-only CPR versus conventional CPR: We recommend that rescuers provide rescue breaths and chest compressions for paediatric in-hospital cardiac arrest and out-of-hospital cardiac arrest. If rescuers cannot provide rescue breaths, they should at least perform chest compressions.

<sup>41</sup> ERC 2010 BLS-011A & BLS-011B: Opening the airway: For unresponsive adults and children, it is reasonable to open the airway using the head tilt–chin lift manoeuvre when assessing breathing or giving ventilations.

3. Seek help from a specialist
  - + Ask someone to call the emergency services on 112. Do this yourself if you are alone. If necessary, use the loudspeaker function on your mobile phone to make the call.
  - + Ask someone to fetch an AED if there is one nearby (see Defibrillation). If you are alone, do not leave the ill person and start resuscitation immediately.
4. Administer further first aid
  - + Start giving the chest compressions (EB<sup>42</sup>, strong recommendation, very low quality evidence) Give 30 chest compressions (EB<sup>43</sup>, weak recommendation, low quality evidence) at a rate of 100 to 120 chest compressions per minute (EB<sup>44</sup>, strong recommendation, very low quality evidence). Compress the chest by about 5 cm (EB<sup>45</sup>, strong recommendation, low quality evidence) (but not by more than 6 cm) (EB<sup>46</sup>, weak recommendation, low quality evidence).
  - + After giving 30 chest compressions (EB<sup>47</sup>, weak recommendation, very low quality evidence) open the airway by tilting the head backwards and lifting the chin up (EB<sup>48</sup>). Give 2 rescue breaths (EB<sup>40</sup>, weak recommendation, low quality evidence).
  - + If you have followed a first aid course, combine chest compressions and rescue breaths in the following ratio: alternate 30 chest compressions with 2 rescue breaths (EB<sup>43</sup>, weak recommendation, low quality evidence; EB<sup>49</sup>, weak recommendation, very low quality evidence).
  - + If you are not trained or if it is not possible to give rescue breaths, give chest compressions only (EB<sup>50</sup>, strong recommendation, very low quality evidence). Give chest compressions continuously at a rate of 100 to 120 per minute (EB<sup>51</sup>, strong recommendation, very low quality evidence).
  - + As soon as an AED is available, continue further resuscitation using this device (see Defibrillation).
  - + If there are one or more other trained first aiders helping you, alternate every two minutes during resuscitation (with every AED analysis) to increase the quality.
  - + Continue resuscitating until:
    - o specialized help arrives, asks you to stop and takes over resuscitation;
    - o the ill person wakes up: he moves, opens his eyes and breathes normally;
    - o you are exhausted.
 Leave any AED electrodes on the chest.
  - + Wash your hands after administering first aid.

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<sup>42</sup> ERC 2015 BLS 372: Chest compression-only CPR versus conventional CPR: We recommend that chest compressions should be performed for all patients in cardiac arrest.

<sup>43</sup> ERC 2015 BLS 362: Compression–ventilation ratio: We suggest a compression–ventilation ratio of 30:2 compared with any other compression–ventilation ratio in patients in cardiac arrest.

<sup>44</sup> ERC 2015 BLS 343: Chest compression rate: We recommend a manual chest compression rate of 100–120/min.

<sup>45</sup> ERC 2015 BLS 366: Chest compression depth: We recommend a chest compression depth of approximately 5 cm (2 in.) during manual CPR.

<sup>46</sup> ERC 2015 BLS 366: Chest compression depth: We recommend avoiding excessive chest compression depths (greater than 6 cm [greater than 2.4 in.] in an average adult) during manual CPR.

<sup>47</sup> ERC 2015 BLS 661: Starting CPR: We suggest commencing CPR with compressions rather than ventilations.

<sup>48</sup> ERC 2015 BLS 372: Chest compression-only CPR versus conventional CPR: We suggest that those who are trained and willing to give rescue breaths do so for all adult patients in cardiac arrest.

<sup>49</sup> ERC 2015 BLS 372: Chest compression-only CPR versus conventional CPR: We suggest that those who are trained and willing to give rescue breaths do so for all adult patients in cardiac arrest.

<sup>50</sup> ERC 2015 BLS 372: Chest compression-only CPR versus conventional CPR: We recommend that chest compressions should be performed for all patients in cardiac arrest.

<sup>51</sup> ERC 2015 BLS 343: Chest compression rate: We recommend a manual chest compression rate of 100–120/min.

The procedure for resuscitating an adult, child or baby is the same to a large extent. We normally use the term baby from new-born up until the age of 1 year, and child from the age of 1 year to the start of adolescence. The nuances are mainly concerned with body structure and not so much with the actual age. You can for instance resuscitate some teenagers as you would an adult. Others still have a child-like body and therefore require adapted techniques.

### 3. Defibrillation

When the heart stops pumping and the circulation stops, we talk of a cardiac arrest. The heart however often remains active afterwards. It can then contract irregularly. This occurs in an abnormal way, which means that the heart no longer contracts rhythmically as a whole, and the heart chambers vibrate chaotically. We call this fibrillation (ventricular fibrillation or chamber fibrillation or VF). This is a life-threatening situation, since the heart can no longer pump blood round and the circulation of oxygen stops. This does not occur in every case of cardiac arrest. For about **half** of those suffering a cardiac arrest the heart does not really stop, but this ventricular fibrillation does occur.

An automated (or automatic) external defibrillator or AED can rectify this potentially life-threatening rhythm disorder by administering an electric shock. We call this defibrillation. By quickly giving the ill person an electric shock, there is an increased chance that the heart rhythm will correct itself (the heart starts pumping normally again). In other words, the use of an AED increases the success rate of resuscitation. An AED will only administer an electric shock if the heart is fibrillating. Not all arrhythmias respond to AED electric shocks.

An AED is a computer-controlled device that will tell you exactly what to do, sometimes with visual but always with spoken instructions (by means of a voice prompt). The device analyses the heart rhythm and decides if an electric shock is required. The device decides completely independently whether an electric shock will help the ill person. If a shock will not help, then the device will **not** shock. **The device will therefore never unnecessarily** administer a shock. Listen carefully, and always follow the device's instructions immediately.

The heart does **not always respond sufficiently** after the first shock. Sometimes defibrillation is required several times. The AED will advise **resuscitating for 2 minutes** after the first shock. After these 2 minutes the device will perform another analysis of the heart rhythm. It will then calculate whether another shock is necessary.

The ill person's survival chances increase significantly if defibrillation occurs within the first few minutes of a sudden cardiac arrest. The emergency services cannot get to the location quickly enough to carry out defibrillation. So that valuable time is not wasted before starting with defibrillation, anyone is authorised to use an AED. Belgian legislation covers AED categories 1 and 2. AEDs in category 1 can be used by anyone, cannot be switched to manual mode to administer a shock yourself and do not contain a screen to monitor heart rhythm. Category 2 AEDs are used in hospitals and ambulances, by specialist staff only.

There is also a difference between fully automated and semi-automated AEDs. A fully automatic device responds fully automatically. You do not need to press a button to administer a shock. With a semi-automated device, you have to press a button yourself to administer a shock. The law says nothing about whether a semi- or fully automated AED should be made available.

You will find AEDs in public spaces, such as train stations, shopping centres, government buildings... Many businesses also have AEDs. Publically accessible AEDs are always category 1 AEDs. They are

usually the fully automated variety. The location of an AED is indicated using an international pictogram. Other pictograms are sometimes used in Belgium.

Depending on the local language, the abbreviation AED is sometimes written as DEA (Wallonia, Spain), DAE (France) or other letter combinations. For instance, DESA stands for Desfibrilador Externo SemiAutomático.

Two electrodes are used with the AED. Electrodes are adhesive strips that you stick on the ill person's chest. They form a good contact with the ill person, which is required for the heart rhythm analysis before the administration of an electric shock. We also call electrodes pads.<sup>52</sup> Apply the electrodes firmly to the bare chest. Place one electrode under the right collar bone and the other in the left armpit (EB<sup>53</sup>).

- + An AED is not a substitute for chest compressions and rescue breaths. After the AED has delivered an electric shock, you must still continue with resuscitation, according to the AED instructions.
- + An AED runs on electricity. Therefore pay attention to the following safety aspects:
  - o Wipe dry the ill person's chest if it is wet (for example, in the event of a drowning, or sweating person...). Move the ill person if he is lying in a puddle of water.
  - o Do not stick the electrodes to medication plasters or a bandage. Remove the medication plasters (if they are in the place where the electrodes should go) and then stick the electrodes.
  - o Do not stick the electrodes on jewellery (for example, a piercing).
  - o Do not stick the electrodes on a nipple or a pacemaker. You will recognise a pacemaker by a lump under a scar, usually below the collar bone.
  - o Stick the electrodes in those places indicated on the packaging, or on the electrodes themselves.
  - o Shave a very hairy chest in the area where the electrodes have to be stuck, so that there is optimal contact between the electrodes and the skin (EB<sup>54</sup>).

### This is what you should do!

- + Continue resuscitating while someone else goes to fetch an AED and switches it on. Continue resuscitating while someone sticks the electrodes to the chest. Defibrillation should not be delayed for long (EB<sup>55</sup>, weak recommendation). As soon as the electrodes have been applied, the device will analyse the heart rhythm.
- + After a shock has been administered, continue immediately with resuscitation (EB<sup>56</sup>, weak recommendation, very low quality evidence). Continue to follow the device's instructions.
- + Always listen to the spoken instructions of the voice prompt, and carry them out immediately.
- + The AED will never give an unannounced or unnecessary shock. A fully automated device delivers a shock itself when recommended, after the voice prompt has announced this. With a

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<sup>52</sup> ERC 2010 ALS-E-037A: Self-adhesive defibrillation pads compared with paddles: For both defibrillation and AF cardioversion, when using biphasic defibrillators, self-adhesive defibrillation pads are safe and effective and are an acceptable alternative to standard defibrillation paddles.

<sup>53</sup> ERC 2010 ALS-E-030A: Placement of paddles/pads: It is reasonable to place paddles/pads on the exposed chest in an anterior-lateral position.

<sup>54</sup> ERC 2010 ALS-E-030A: Placement of paddles/pads: Consideration should be given to the rapid removal of excessive chest hair before the application of paddles/pads but emphasis must be on minimising delay in shock delivery.

<sup>55</sup> ERC 2015 BLS 363: CPR before defibrillation: During an unmonitored cardiac arrest, we suggest a short period of CPR until the defibrillator is ready for analysis and, if indicated, defibrillation.

<sup>56</sup> ERC 2015 BLS 345: Rhythm check timing: We suggest immediate resumption of chest compressions after shock delivery for adults in cardiac arrest in any setting.

semi-automated device, you have to administer the shock yourself by pressing the button. The voice prompt will ask you to do this.

- + Interrupt the chest compressions as little as possible. Stop the chest compressions every 2 minutes to assess the heart rhythm (EB<sup>57</sup>, weak recommendation, low quality evidence). The voice prompt will tell you when to do this. If there are several first aiders, alternate with each other every 2 minutes. In other words, after every AED analysis.

## 4. Resuscitation and defibrillation of babies and infants

First aiders are sometimes wary of resuscitating children, for fear of causing injury if they are not specifically trained in resuscitating children. This fear is ungrounded. It is much better to apply resuscitation techniques used on adults to resuscitate a child, than to do nothing. Therefore, the techniques for resuscitating an adult also apply to resuscitating children who are not responding or not breathing normally.

In this case, a baby is a child younger than 1 year. Up to the start of puberty, we talk of a child.

Approaching an ill child or baby as victim is identical to that for adults.

Call the emergency services immediately if you suspect that a child is suffering from cardiac arrest. Resuscitate for 1 minute before fetching help, and in the unlikely event that you are the only first aider.

- + If there is more than one first aider present, one should start resuscitation while the other fetches help.
- + If there is only one first aider present, he should resuscitate for approximately 1 minute (or 5 cycles of chest compressions and rescue breaths), before calling for help. To keep interruptions in resuscitation to a minimum, you can carry the baby or small child with you if necessary when you go to get help.

### 3.1 Giving chest compressions to children

If you have to use heart massage on a child, use the same technique as for an adult, taking into account the following changes:

- + Compress the chest by at least a third of its depth (4 cm for babies, 5 cm for children) (EB<sup>58</sup>, weak recommendation, very low quality evidence).
- + If the ill person is a baby (a child younger than 1 year), use two fingers to carry out the chest compressions. If you are the only first aider present, compress the chest with two finger tips next to each other. If there are two or more first aiders, the circumferential technique is recommended (EB<sup>59</sup>). This involves placing both thumbs flat next to each other on the lower

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<sup>57</sup> ERC 2015 BLS 346: Timing of CPR cycles: We suggest pausing chest compressions every 2 min to assess the cardiac rhythm.

<sup>58</sup> ERC 2015 Peds 394: Chest compression depth: We suggest that rescuers compress the chests of infants by at least one third the anterior–posterior dimension, or approximately 1½" (4 cm). We suggest that rescuers compress the child's chest by at least one third of the anterior–posterior dimension, or approximately 2" (5 cm).

<sup>59</sup> ILCOR 2005 W9B: Circumferential versus two-finger chest compressions: The two thumbencircling hands chest compression technique with thoracic squeeze is the preferred technique for two-rescuer infant CPR. The twofinger technique is recommended for one-rescuer infant CPR to facilitate rapid transition between compression and

half of the sternum, with the tips aimed at the baby's head. Spread both hands with closed fingers around the lower part of the chest. The fingers should support the baby's back.

- + If the child is older than 1 year, use one or two hands, depending on what is required to reach sufficient compression depth (in bigger children or small first aiders this is easier to do using both hands, with the fingers locked together) (EB<sup>60</sup>). While giving chest compressions with one hand, your other hand can rest on the head.
- + For people with a duty to respond in paediatric emergencies (usually health professionals): after 15 chest compressions tilt the head back, lift the chin up and give 2 effective rescue breaths. Continue with the chest compressions and rescue breaths in a ratio of 15 compressions to 2 rescue breaths.

Other first aiders should, for the sake of simplicity, use the ratio of 30 chest compressions to 2 rescue breaths, as with adults (EB<sup>61</sup>; EB<sup>62</sup>, strong recommendation, low quality evidence).

## 3.2 Giving rescue breaths to children

If you have to give rescue breaths to a child, use the same technique as for an adult, taking into account the following changes:

- + Give 5 rescue breaths after assessing the condition of the ill person. We call this initial rescue breaths. Next, continue the resuscitation by giving chest compressions and rescue breaths.
- + For people with a duty to respond in paediatric emergencies (usually health professionals): after alerting the emergency services, combine chest compressions and rescue breaths at a ratio of 15 compressions to 2 rescue breaths.

Other first aiders should, for the sake of simplicity, use the ratio of 30 chest compressions to 2 rescue breaths, as with adults (EB<sup>61</sup>; EB<sup>62</sup>, strong recommendation, low quality evidence).

- + If the ill person is a baby:
  - o Put the baby's head in a neutral position and lift up the chin. A baby's head is often inclined. To achieve the neutral position, you may have to tilt the head backwards slightly. If necessary, use a rolled up towel under the upper body to retain the neutral position.
  - o Do not pinch the nose shut, but place your mouth over the mouth and nose of the baby to give rescue breaths (EB<sup>63</sup>).

## 3.3 Using an AED on children

The **chance** that children will need to be defibrillated is **much smaller** than with adults. Cardiac arrest in children is not usually the result of ventricular fibrillation.

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ventilation to minimise interruptions in chest compressions. It remains an acceptable alternative method of chest compressions for two rescuers.

<sup>60</sup> ERC 2010 Peds-033: One- versus two-hand chest compression in children: Either a one- or two-hand technique can be used for performing chest compressions in children.

<sup>61</sup> ERC 2010 Peds-011B: Optimal compression-ventilation ratio for infants and children: For ease of teaching and retention, a compression-ventilation ratio of 30:2 is recommended for the lone rescuer performing CPR in infants and children, as is used for adults. For healthcare providers performing two-rescuer CPR in infants and children, a compression-ventilation ratio of 15:2 is recommended.

<sup>62</sup> ERC 2015 Peds 414: Chest compression-only CPR versus conventional CPR: We recommend that rescuers provide rescue breaths and chest compressions for paediatric in-hospital cardiac arrest and out-of-hospital cardiac arrest. If rescuers cannot provide rescue breaths, they should at least perform chest compressions.

<sup>63</sup> ILCOR 2005 W7B: Ventilation in infants: There are no data to justify a change from the recommendation that the rescuer attempt mouth-to-mouth-and-nose ventilation for infants. Rescuers who have difficulty achieving a tight seal over the mouth and nose of an infant, however, may attempt either mouth-to-mouth or mouth-to-nose ventilation.

The use of an AED device on babies and children is the same as for adults. Standard AEDs are normally suitable for use on children older than 8 years. If available, use electrodes specially adapted for children (paediatric pads) and an AED in paediatric mode (with a dose attenuator that reduces the amount of electricity administered) for children from 1 to 8 years.<sup>64</sup> An AED is not normally used for babies younger than 1 year. You can use an AED with a dose attenuator if there is no other option.

Apply the electrodes firmly to the bare chest. Place one electrode under the right collar bone and the other in the left armpit. If the electrodes are too big and there is a risk of them touching each other, place one electrode on the upper back, under the left shoulder blade, and the other on the front, left of the sternum (EB<sup>65</sup>).

If there are no adapted AED or pads available, use a standard AED for adults.

In summary, the techniques for resuscitating a child or baby versus an adult are as follows:

	<b>Adult</b>	<b>Child</b>	<b>Baby</b>
<b>Positioning for chest compressions</b>	Place two hands in the middle of the chest (EB <sup>66</sup> , weak recommendation, very low quality evidence)	Place one or two hands in the middle of the chest (EB <sup>67</sup> )	Place two fingers in the middle of the chest (EB <sup>68</sup> )
<b>Depth of chest compressions</b>	Approximately 5 cm (EB <sup>69</sup> , strong recommendation, low quality evidence) (not more than 6 cm) (EB <sup>70</sup> , weak recommendation, very low quality evidence)	At least a third of the depth of the chest (5 cm) (EB <sup>71</sup> , weak recommendation, very low quality evidence)	At least a third of the depth of the chest (4 cm) (EB <sup>68</sup> , weak recommendation, very low quality evidence)

<sup>64</sup> ERC 2010 Peds-001A & Peds-001B: AED use in infants: For treatment of out-of-hospital VF/pulseless VT in infants, the recommended method of shock delivery by device is listed in order of preference below. If there is any delay in availability of the preferred device, the available device should be used. The AED algorithm should have demonstrated high specificity and sensitivity for detecting shockable rhythms in infants. The order of preference is as follows: (1) Manual defibrillator, (2) AED with dose attenuator and (3) AED without dose attenuator.

<sup>65</sup> ERC 2010: Pad position: There is insufficient evidence to alter the current recommendations to use the largest size paddles/pads that fit on the infant or child's chest without touching each other or to recommend one paddle/pad position or type over another.

<sup>66</sup> ERC 2015 BLS 357: Hand position during compressions: We suggest performing chest compressions on the lower half of the sternum on adults in cardiac arrest.

<sup>67</sup> ERC 2010 Peds-033: One- versus two-hand chest compression in children: Either a one- or two-hand technique can be used for performing chest compressions in children.

<sup>68</sup> ILCOR 2005 W9B: Circumferential versus two-finger chest compressions: The two thumbencircling hands chest compression technique with thoracic squeeze is the preferred technique for two-rescuer infant CPR. The two-finger technique is recommended for one-rescuer infant CPR to facilitate rapid transition between compression and ventilation to minimise interruptions in chest compressions. It remains an acceptable alternative method of chest compressions for two rescuers.

<sup>69</sup> ERC 2015 BLS 366: Chest compression depth: We recommend a chest compression depth of approximately 5 cm (2 in.) during manual CPR.

<sup>70</sup> ERC 2015 BLS 366: Chest compression depth: We recommend avoiding excessive chest compression depths (greater than 6 cm [greater than 2.4 in.] in an average adult) during manual CPR.

<sup>71</sup> ERC 2015 Peds 394: Chest compression depth: We suggest that rescuers compress the chests of infants by at least one third the anterior-posterior dimension, or approximately 1½" (4 cm). We suggest that rescuers compress the child's chest by at least one third of the anterior-posterior dimension, or approximately 2" (5 cm).

	recommendation, low quality evidence)		
<b>Rate of chest compressions</b>	100 to 120 chest compressions per minute (EB <sup>72</sup> , strong recommendation, very low quality evidence)		
<b>Ratio chest compressions/rescue breaths</b>	30 chest compressions and 2 rescue breaths* (EB <sup>73</sup> , weak recommendation, low quality evidence)	5 initial rescue breaths, 30 chest compressions and 2 rescue breaths*	5 initial rescue breaths, 30 chest compressions and 2 rescue breaths
<b>Use of an AED</b>	2 standard electrodes (under right collar bone, in left armpit) (EB <sup>74</sup> ), standard AED	Preferably 2 adapted electrodes (under right collar bone and in left armpit, or on upper back under left shoulder blade and on front left of sternum), AED with paediatric mode	Usually no defibrillation

\* People with a duty to respond in paediatric emergencies should use the ratio of 15 compressions to 2 rescue breaths (EB<sup>75</sup>).

<sup>72</sup> ERC 2015 BLS 343: Chest compression rate: We recommend a manual chest compression rate of 100–120/min.

<sup>73</sup> ERC 2015 BLS 362: Compression-ventilation ratio: We suggest a compression-ventilation ratio of 30:2 compared with any other compression-ventilation ratio in patients in cardiac arrest.

<sup>74</sup> ERC 2010 ALS-E-030A: Placement of paddles/pads: It is reasonable to place paddles/pads on the exposed chest in an anterior-lateral position.

<sup>75</sup> ERC 2010 Peds-011B: Optimal compression-ventilation ratio for infants and children: Optimal compression-ventilation ratio for infants and children: For ease of teaching and retention, a compression-ventilation ratio of 30:2 is recommended for the lone rescuer performing CPR in infants and children, as is used for adults. For healthcare providers performing two-rescuer CPR in infants and children, a compression-ventilation ratio of 15:2 is recommended.

# Bleeding

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# 1. External bleeding

## 1.1 Severe bleeding

### What do you see?

- + The injured person has a wound that is bleeding profusely. There is major blood loss.
- + The blood gushes or pours out of the wound.

### This is what you should do!

1. Make the area safe
  - + Ask the injured person to put pressure on the wound himself if possible (EB<sup>76</sup>, weak recommendation, very low quality evidence).
  - + Put on disposable gloves (EB<sup>77</sup>, weak recommendation, very low quality evidence).
  - + Is the injured person sitting or standing? Help him to lie down on the ground while he continues to put pressure on the wound.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing if necessary.
3. Seek help from a specialist
  - + Ask someone to call the emergency services on 112. Do this yourself if you are alone. At the same time, make sure the injured person continues to put pressure on the wound with his hands (EB<sup>76</sup>, weak recommendation, very low quality evidence). If that does not work, put pressure on the wound yourself and if necessary use the loudspeaker function on your mobile phone to make the call.
4. Administer further first aid
  - + Put pressure on the wound with your hands while waiting for bandaging material (EB<sup>76</sup>, weak recommendation, very low quality evidence).
  - + As soon as you have bandaging material, apply a pressure bandage, use other bandages, or place a clean cloth (for example, a tea towel) on the wound and press on that.
  - + Do not remove the bandage or cloth, even if the blood soaks through or if you want to assess the state of the wound. If the wound continues to bleed, place an extra cloth or bandage on top without reducing the pressure. Try to increase the pressure on the wound. Press more firmly in the area that is bleeding (EB<sup>76</sup>, weak recommendation, very low quality evidence).
  - + Continue to apply pressure to the wound until the emergency services arrive (EB<sup>76</sup>, weak recommendation, very low quality evidence).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>78</sup>, strong recommendation, low quality evidence).

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<sup>76</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence, neither in favour of manual compression nor vascular closing devices.

<sup>77</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that the first aider wears gloves when there is a possibility of contact with blood.

<sup>78</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

## 1.2 Burst varicose vein

### What do you see?

- + The injured person's leg is bleeding. You are able to deduce from the circumstances that he has bumped into something.
- + The injured person also has varicose veins elsewhere on the legs.

### This is what you should do!

1. Make the area safe
  - + Put on disposable gloves (EB<sup>79</sup>, weak recommendation, very low quality evidence).
  - + Is the injured person sitting or standing? Help him to lie down on the ground.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing if necessary.
3. Seek help from a specialist
  - + Is the wound bleeding badly? Call the emergency services on 112. In the meantime, put pressure on the wound with your hands and if necessary use the loudspeaker function on your mobile phone to make the call (EB<sup>80</sup>, weak recommendation, very low quality evidence).
  - + If the wound is not bleeding badly, contact a general practitioner.
4. Administer further first aid
  - + Put pressure on the wound with your hands while waiting for bandaging material (EB<sup>80</sup>, weak recommendation, very low quality evidence).
  - + As soon as you have bandaging material, apply a pressure bandage, use other bandages, or place a clean cloth (for example, a towel) on the wound and put pressure on it (EB<sup>80</sup>, weak recommendation, very low quality evidence).
  - + Do not remove the bandage or cloth, even if the blood soaks through or if you want to assess the state of the wound. If the wound continues to bleed, place an extra cloth or bandage on top without reducing the pressure. Try to increase the pressure on the wound. Press more firmly in the area that is bleeding (EB<sup>80</sup>, weak recommendation, very low quality evidence).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>81</sup>, strong recommendation, low quality evidence).

It is often difficult for an injured person with a burst varicose vein to put pressure on the wound because of its location. If the injured person can access the wound (for example, by folding his lower leg), he can of course put pressure on the wound himself (EB<sup>80</sup>, weak recommendation, very low quality evidence).

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<sup>79</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that the first aider wears gloves when there is a possibility of contact with blood.

<sup>80</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence, neither in favour of manual compression nor vascular closing devices.

<sup>81</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

## 1.3 Amputation

### What do you see?

Has (part of) a limb been partially severed?

Yes, partially.	No, completely.
<ul style="list-style-type: none"> <li>+ (Part of) a limb has been <b>partially</b> severed or cut off.</li> <li>+ It is still attached to the rest of the body.</li> <li>+ Due to contraction of the muscles and blood arteries, there is not always intense bleeding immediately after the accident. However, this can happen later.</li> </ul>	<ul style="list-style-type: none"> <li>+ (Part of) a limb has been <b>completely</b> severed or cut off.</li> <li>+ You may see the body part lying nearby.</li> <li>+ Due to contraction of the muscles and blood arteries, there is not always intense bleeding immediately after the accident. However, this can happen later.</li> </ul>

### This is what you should do!

<ol style="list-style-type: none"> <li>1. Make the area safe           <ul style="list-style-type: none"> <li>+ Ask the injured person to put pressure on and around the wound if possible. (EB<sup>82</sup>, weak recommendation, very low quality evidence) Ask him, if possible, to hold the partially amputated limb in a normal position.</li> <li>+ Try to immobilise the limb as much as possible, so that partial amputation does not progress to full amputation.</li> <li>+ Put on disposable gloves (EB<sup>83</sup>, weak recommendation, very low quality evidence).</li> <li>+ Is the injured person sitting or standing? Help him to lie down on the ground.</li> </ul> </li> <li>2. Assess the condition of the injured person           <ul style="list-style-type: none"> <li>+ Find out what is wrong with the injured person.</li> <li>+ Check whether the injured person is conscious.</li> <li>+ Open the airway and check the injured</li> </ul> </li> <li>3. Seek help from a specialist           <ul style="list-style-type: none"> <li>+ Ask someone to call the emergency services on 112. Do this yourself if you are alone.</li> </ul> </li> <li>4. Administer further first aid           <ul style="list-style-type: none"> <li>+ Put pressure on the wound with your hands while waiting for bandaging</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>1. Make the area safe           <ul style="list-style-type: none"> <li>+ Ask the injured person to put pressure on the wound (EB<sup>82</sup>, weak recommendation, very low quality evidence).</li> <li>+ Put on disposable gloves (EB<sup>83</sup>, strong recommendation, very low quality evidence).</li> <li>+ Is the injured person sitting or standing? Help him to lie down on the ground</li> </ul> </li> <li>2. Assess the condition of the injured person           <ul style="list-style-type: none"> <li>+ Find out what is wrong with the injured person. Check whether the injured person is conscious.</li> <li>+ Open the airway and check the injured person's breathing if necessary.</li> </ul> </li> <li>3. Seek help from a specialist           <ul style="list-style-type: none"> <li>+ Ask someone to call the emergency services on 112. Do this yourself if you are alone.</li> </ul> </li> <li>4. Administer further first aid           <ul style="list-style-type: none"> <li>+ Put pressure on the wound with your hands while waiting for bandaging material (EB<sup>82</sup>, weak recommendation, very low quality evidence).</li> <li>+ As soon as you have bandaging material, apply a pressure bandage, use</li> </ul> </li> </ol>
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<sup>82</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence, neither in favour of manual compression nor vascular closing devices.

<sup>83</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that the first aider wears gloves when there is a possibility of contact with blood.

<p>material (EB<sup>84</sup>, weak recommendation, very low quality evidence).</p> <ul style="list-style-type: none"> <li>+ As soon as you have bandaging material, apply a pressure bandage if possible, use other bandages, or place a clean cloth (for example, a tea towel) around and where possible on the wound. Put pressure on it (EB<sup>84</sup>, weak recommendation, very low quality evidence).</li> <li>+ Cover the wound with a sterile dressing where possible. Use bandages to keep the limb in place. Take off your disposable gloves and wash your hands after administering first aid (EB<sup>85</sup>, strong recommendation, low quality evidence).</li> </ul>	<p>other bandages, or place a clean cloth (for example, a tea towel) on the wound. Put pressure on it (EB<sup>84</sup>, weak recommendation, very low quality evidence).</p> <ul style="list-style-type: none"> <li>+ Cover the wound with a sterile dressing where possible. Keep the amputated limb dry and cool.</li> <li>+ Ensure that the severed body part goes with the injured person to the hospital.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>85</sup>, strong recommendation, low quality evidence).</li> </ul>
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## 2. Internal bleeding

### 2.1 Bruising

#### What do you see?

- + The injured person has a bluish-red mark on the skin.
- + The bruise may be painful to the touch.

#### This is what you should do!

1. Make the area safe
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person. Ask him if he also has other symptoms, such as headache, dizziness, difficulty breathing or stomachache. These may indicate a serious internal injury.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o there are additional symptoms;
    - o the injured person has large or frequently occurring bruising on various parts of the body;
    - o the injured person's condition deteriorates.
4. Administer further first aid

<sup>84</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence, either in favour of manual compression or vascular closing devices.

<sup>85</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

- + Cool the site of bruising for a maximum of 20 minutes with ice cubes in a bag of water or a cool bag to reduce the swelling and pain (EB<sup>86,87</sup>, weak recommendation, low quality evidence). While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Use a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. If you do not have any ice, use cold water.

## 2.2 Crushing

### What do you see?

- + One or more body parts are crushed between two heavy objects (or between a heavy object and the ground).

### This is what you should do!

1. Make the area safe
  - + Ensure that any potential danger has been eliminated.
  - + Take all measures necessary to prevent you, the injured person or any bystanders from getting hurt again when the obstruction is removed.
  - + Put on industrial gloves to protect your own hands (EB<sup>88</sup>, weak recommendation, very low quality evidence).
  - + Try and free the injured person immediately after the accident with the help of bystanders or by using equipment, such as a crow-bar or a car jack.
  - + Do not free the injured person if:
    - o you have insufficient manpower or tools to do so safely;
    - o he has been trapped for longer than 30 minutes;
    - o a large part of his body is trapped (for example, the chest, the pelvis) by a heavy object;
    - o there is a risk of incurring additional injuries when freeing him (both physical injury to the injured person or for example the risk of the building in which he is trapped collapsing).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing.
3. Seek help from a specialist
  - + Consult the emergency services on 112 and describe how the injured person is trapped (for example, his hand is trapped in a printing press, or his chest is trapped under a collapsed scaffold).
4. Administer further first aid
  - + Stay with the injured person and tell him that the emergency services have been alerted.
  - + Treat any other injuries.
  - + Check the injured person's consciousness and breathing every minute.

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<sup>86</sup> ES Bruise – ice: p 73 in summary book: There is limited evidence, neither in favour of using a cold compress nor no treatment. Expert panel recommends cooling for 20 minutes.

<sup>87</sup> ILCOR FA 530: Control of bleeding: We suggest that localized cold therapy with or without pressure may be beneficial in hemostasis for closed bleeding in extremities.

<sup>88</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that the first aider wears gloves when there is a possibility of contact with blood.

- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>89</sup>, strong recommendation, moderate quality evidence).

## 2.3 Blue nail

### What do you see?

- + You see a small bloodstain under the nail.
- + Sometimes the whole nail will be black and blue.
- + The nail in question may be painful to the touch.

### This is what you should do!

1. Make the area safe
  - + Ensure that any potential danger has been eliminated.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the injured person has a completely bruised nail;
    - o he has additional injuries to the finger or toe;
    - o he is suffering serious pain;
    - o he is (probably) not sufficiently protected against tetanus (not vaccinated, booster vaccination too long ago, there is some doubt)
4. Administer further first aid
  - + If the accident has just happened, cool the finger or toe for a maximum of 20 minutes with ice cubes in a bag of water or a cool bag to minimise swelling and pain (EB<sup>90, 91</sup>, weak recommendation, low quality evidence). While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Use a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. If you do not have any ice, use cold water.

## 3. Externalised bleeding

### 3.1 Bleeding from the nose (nosebleed)

#### What do you see?

- + Blood is dripping or running from the nose. It may also run down into the throat.
- + If the injured person has swallowed blood, he may be feeling nauseous.

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<sup>89</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>90</sup> ILCOR FA 530: Control of bleeding: We suggest that localized cold therapy with or without pressure may be beneficial in hemostasis for closed bleeding in extremities.

<sup>91</sup> ES Bruise – ice: p 73 in summary book: There is limited evidence, neither in favour of using a cold compress nor no treatment. Expert panel recommends cooling for 20 minutes.

### This is what you should do!

1. Make the area safe
  - + Put on disposable gloves (EB<sup>92</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o after 10 minutes (two times 5 minutes) of pinching the nose, the bleeding still has not stopped (EB<sup>93</sup>, weak recommendation);
    - o the cause of the nosebleed is a blow or punch, so that the doctor can check for other injuries (for example, a break in the nose bone);
    - o the nosebleed gets worse or is accompanied by other symptoms (headache, hematoma around the eyes ...);
    - o the condition of the injured person is serious, he becomes sleepy or loses consciousness.
4. Administer further first aid
  - + Let the injured person sit down. Ask him to incline his head a little. We call this the reading position. It is the position someone would assume while sitting reading a book.
  - + Ask the injured person to breathe through his mouth.
  - + Do not let the injured person blow his nose.
  - + Ask the injured person to pinch his nostrils together for 5 minutes without interruption, just below the hard part of the nose. The injured person should only pinch together the nostril on the side from which it is bleeding. If it is not obvious where the blood is coming from, let him pinch both nostrils together at the same time (EB<sup>93</sup>, weak recommendation, very low quality evidence).
  - + After 5 minutes, check to see if the bleeding has stopped. If it has not, ask the injured person to pinch his nostrils together for another 5 minutes (EB<sup>93</sup>, weak recommendation, very low quality evidence).
  - + When the bleeding has stopped, carefully clean the outside of the nose and if necessary the face with water. Advise him to take it easy for a while, not to blow his nose for a few hours, not to pick his nose and to move his nose as gently as possible.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>94</sup>, strong recommendation, low quality evidence).

If the injured person is taking blood thinners or has known coagulation problems, advise him to consult a doctor if he has regular nosebleeds (EB<sup>95</sup>, weak recommendation, very low quality evidence).

### Preventing a nosebleed

- + Do not pick your nose. Try not to blow your nose too forcefully.

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<sup>92</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that the first aider wears gloves when there is a possibility of contact with blood.

<sup>93</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence, neither in favour of manual compression nor vascular closing devices. Expert panel judges that pinching the nose for 10 minutes is too long and recommends that 5 minutes pinching is enough and can be repeated (if necessary).

<sup>94</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>95</sup> ES Nasal bleedings – Aspirin: p84 in summary book: There is limited evidence with harmful effect for aspirin.

## Bleeding

- + If you suffer from regular nosebleeds and you are taking medication (for example, blood thinners containing acetylsalicylic acid), consult your doctor. He may suggest adjusting your medication (EB<sup>95</sup>, weak recommendation, very low quality evidence).
- + If you frequently suffer from nosebleeds, avoid pushing, lifting or bending down.
- + If you suffer from high blood pressure, consult a doctor.

### 3.2 Bleeding from the ear

#### What do you see?

- + The injured person is bleeding from the ear.
- + Sometimes the injured person hears less well or hears noise in the ear.
- + The injured person may suffer from dizziness or impaired balance.
- + You may occasionally see evidence of a serious injury (see Head Injury).

#### This is what you should do!

1. Make the area safe
  - + Put on disposable gloves (EB<sup>96</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing if necessary.
3. Seek help from a specialist
  - + Seek help from a specialist if an injured person is bleeding from the ear.
  - + Call the emergency services on 112 if you also observes signs of a head injury (see Head Injury) in an injured person bleeding from the ear.
4. Administer further first aid
  - + If there is a lot of blood on the face, use the tip of a damp compress to clean up the ear canal and observe if more blood comes out of the ear. Be careful not to get water in the ear canal.
  - + If there are signs indicating a fractured skull, ask the injured person not to move (see Head Injury).
  - + If possible, hold the head with the bleeding ear pointing downwards, so that blood clots do not have the chance to form in the ear canal.
  - + Cover the bleeding ear with a dry bandage. Never stick cotton wool balls or other blood-staunching objects into the ear canal.
  - + Take off your disposable gloves and wash your hands after administering first aid. (EB<sup>97</sup>, strong recommendation, very low quality evidence)

- ! Never drip liquid (for instance water, oil or ear drops) into a bleeding ear without the doctor's advice.
- ! Never stick cotton wool balls or other blood-staunching objects into the ear canal.

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<sup>96</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that the first aider wears gloves when there is a possibility of contact with blood.

<sup>97</sup> Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

## 3.3 Bleeding from the mouth

### What do you see?

- + Blood is flowing from the injured person's mouth.
- + The injured person may feel pain in or around the mouth, teeth or gums.
- + You may occasionally see evidence of a serious injury (see Head Injury).

### This is what you should do!

1. Make the area safe
  - + Put on disposable gloves (EB<sup>98</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing if necessary.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o you suspect that the wound needs stitching (big or deep wound);
    - o the wound continues to bleed;
    - o the gums are painful and swollen;
    - o you cannot see a wound in the mouth.
  - + Call the emergency services on 112 if
    - o the blood loss is the result of a serious blow or punch to the head;
    - o the injured person is coughing up or vomiting blood;
    - o the injured person is losing a lot of blood from the mouth.
4. Administer further first aid
  - + Does the injured person have a wound in the mouth?

Yes	No
<ul style="list-style-type: none"> <li>+ Let the injured person rinse out his mouth with cold, clean water.</li> <li>+ Ask him to open his mouth so that you can look at the wound.</li> <li>+ Press a damp compress against the wound and tell the injured person to bite on it (EB<sup>99</sup>, weak recommendation, very low quality evidence). Do not do this if there is a high chance that the injured person will swallow the compress (for example, a small child, a drunk or agitated injured person or an injured person with impaired consciousness). In these cases, use a wet facecloth.</li> </ul>	<ul style="list-style-type: none"> <li>+ Let the injured person rinse out his mouth with cold, clean water.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>100</sup>, strong recommendation, very low quality evidence).</li> </ul>

<sup>98</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that the first aider wears gloves when there is a possibility of contact with blood.

<sup>99</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence, neither in favour of manual compression nor vascular closing devices.

<ul style="list-style-type: none"> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>100</sup>, strong recommendation, very low quality evidence).</li> </ul>	
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Watery or pink blood loss from the mouth, together with signs of a head injury, may point to a fractured skull. This is a life-threatening condition.

## 3.4 Broken or avulsed tooth

### What do you see?

- + The injured person has a broken or avulsed tooth (the tooth has fallen out).

### This is what you should do!

1. Make the area safe
  - + Put on disposable gloves (EB, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if the injured person has a broken or avulsed tooth. Take the injured person along with the broken or avulsed tooth to the dentist.
4. Administer further first aid
  - + Let the injured person rinse out his mouth with cold, clean water.
  - + Press a damp compress against the wound or tell the injured person to bite on it (EB<sup>99</sup>, weak recommendation, very low quality evidence). Do not do this if there is a high chance that the injured person will swallow the compress (for example, a small child, an agitated person or a person with impaired consciousness). In these cases, use a wet facecloth.
  - + If necessary protect the sharp edges of a broken tooth with a compress.
  - + Only touch an avulsed tooth at the crown. Do not touch the root (the part that goes into the gum).
  - + Rinse a visibly dirty avulsed tooth for a maximum of 10 seconds in milk or under cold running tap water. Keep the tooth temporarily in a little pot with milk and take it along with the injured person to the dentist (EB<sup>101</sup>, weak recommendation, very low quality evidence).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>102</sup>, strong recommendation, very low quality evidence).

You can also keep the tooth in the injured person's mouth, under his tongue, until you reach the dentist. However, there is a real risk of the injured person swallowing the tooth. This method is therefore not the preferred one. If you do not have milk, you can also keep the tooth in a little pot with some of the injured person's saliva (EB<sup>101</sup>, weak recommendation, very low quality evidence).

<sup>100</sup> Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>101</sup> ILCOR FA794: dental avulsion: We suggest the use of whole milk in comparison with saline as a temporary storage solution for an avulsed tooth. There is insufficient evidence for or against temporary storage of an avulsed tooth in saliva compared with alternative solutions.

<sup>102</sup> Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

## 3.5 Anal blood loss

### What do you see?

- + The injured person is losing blood from the anus.

### This is what you should do!

1. Make the area safe
  - + Put on disposable gloves (EB<sup>103</sup>, weak recommendation, very low quality evidence).
  - + Put the injured person in a quiet, comfortable environment with the necessary privacy.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist, even if there are no other symptoms.
4. Administer further first aid
  - + Is sexual aggression the cause of the anal blood loss?

Yes	No
<ul style="list-style-type: none"> <li>+ Advise the injured person not to wash himself, not to use the toilet, and not to wash his clothes before being examined by a doctor and/or the police. This is because it is vital that traces of the perpetrator are not removed.</li> <li>+ The injured person is experiencing a traumatic moment. Treat him with understanding and discretion.</li> <li>+ Give the injured person a sanitary towel or clean towel. Cover the anus or offer the injured person the necessary material.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>104</sup>, strong recommendation, very low quality evidence).</li> </ul>	<ul style="list-style-type: none"> <li>+ Give the injured person the opportunity to wash himself.</li> <li>+ Give the injured person a sanitary towel or clean towel. Cover the anus or offer the injured person the necessary material.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>104</sup>, strong recommendation, very low quality evidence).</li> </ul>

## 3.6 Vaginal blood loss

### What do you see?

- + The injured person is losing blood from the vagina.

### This is what you should do!

1. Make the area safe

<sup>103</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that the first aider wears gloves when there is a possibility of contact with blood.

<sup>104</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

## Bleeding

- + Put on disposable gloves (EB<sup>105</sup>, weak recommendation, very low quality evidence).
  - + Put the injured person in a quiet, comfortable environment with the necessary privacy.
2. Assess the condition of the injured person
    - + Find out what is wrong with the injured person.
  3. Seek help from a specialist
    - + Seek help from a specialist if the vaginal bleeding is unexpected, very heavy or very painful.
    - + Always refer a pregnant women with vaginal bleeding to a doctor.
  4. Administer further first aid
    - + Is sexual aggression the cause of the vaginal blood loss?

Yes	No
<ul style="list-style-type: none"> <li>+ Advise the injured person not to wash herself, not to use the toilet, and not to wash her clothes before being examined by a doctor and/or the police. This is because it is vital that traces of the perpetrator are not removed.</li> <li>+ The injured person is experiencing a traumatic moment. Treat her with understanding and discretion. Give the injured person a sanitary towel or clean towel. Cover the pubic area or offer her the necessary material.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>106</sup>, strong recommendation, very low quality evidence).</li> </ul>	<ul style="list-style-type: none"> <li>+ Give the injured person the opportunity to wash herself.</li> <li>+ Give her a sanitary towel or clean towel. Cover the pubic area or offer her the necessary material.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>106</sup><sup>107</sup>, strong recommendation, very low quality evidence)</li> </ul>

## 3.7 Blood in the urine

### What do you see?

- + There is blood in the injured person's urine.
- + The injured person may suffer pain when urinating.
- + The injured person may suffer pain in the lumbar region or lower abdomen.

### This is what you should do!

1. Make the area safe
  - + Put on disposable gloves (EB<sup>106</sup>, weak recommendation, very low quality evidence)
  - + Put the injured person in a quiet, comfortable environment with the necessary privacy.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist, even if there are no other symptoms.

<sup>105</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that the first aider wears gloves when there is a possibility of contact with blood.

<sup>106</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

4. Administer further first aid
  - + Let the injured person choose a comfortable position. The injured person may prefer to keep walking around. Lying on the affected side is sometimes the least painful, possibly with a cushion pressing on the wound.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>106</sup>, strong recommendation, very low quality evidence).

## 4. Shock induced by blood loss

### Preventing shock induced by blood loss

The faster you identify the threat of shock, the smaller the chance of it developing into life-threatening shock. Be alert for signs that may indicate shock in:

- + injured persons who have suffered a serious blow to the abdomen;
- + injured persons with serious facial or head injuries (scalp injuries, i.e. wounds whereby a (hairy) scalp has been severed);
- + injured persons with gunshot or serious knife wounds;
- + injured persons who (may) have suffered a fracture to the pelvis or upper leg;
- + injured persons (often children or the elderly) who have lost a lot of fluid (for example from diarrhoea, vomiting, burns);
- + injured persons who have been trapped a long time before being rescued.

### What do you see?

The injured person may be exhibiting several of the symptoms below. These will not all present at the same time.

- + The injured person is bleeding severely.
- + The injured person feels drowsy, confused, unwell and dizzy when standing up. The faint feeling does not go away when the injured person lies down.
- + The injured person becomes pale, starts sweating and shivering, and complains of being cold (cold sweat). Hands and feet may feel cold.
- + The injured person is nauseous and may feel like vomiting.
- + The injured person's breathing turns superficial and fast.
- + The injured person loses consciousness after a while.

### This is what you should do!

1. Make the area safe
  - + Put on disposable gloves (EB<sup>107</sup>, weak recommendation, very low quality evidence).
  - + Help the injured person to lie down.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing.
3. Seek help from a specialist

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<sup>107</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that the first aider wears gloves when there is a possibility of contact with blood.

## Bleeding

- + Call the emergency services immediately on 112.
- 4. Administer further first aid
  - + Staunch severe external bleeding (see External bleeding) (EB<sup>108</sup>, weak recommendation, very low quality evidence).
  - + Be alert for possible hypothermia. Ensure that the injured person does not become hypothermic (see Hypothermia) (EB<sup>109,110</sup>, weak recommendation, low to very low quality evidence).
  - + Let the injured person rest, with no further exertions. Ensure that he remains as calm as possible.
  - + Check the injured person's consciousness and breathing every minute.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>111</sup>, strong recommendation, very low quality evidence).

### Summaries made for topics for which no evidence could be identified:

- Wound management – Wearing gloves for bleeding effects for care givers: p32 in summary book
- Wound management – Wearing plastic bags for bleeding for care givers: p38 in summary book
- Wound management – Wearing plastic bags for bleeding for patients: p40 in summary book
- Amputation – Keeping amputated body part on ice: p71 in summary book
- Crush injury – Extraction: p75 in summary book
- Nasal bleeding – Posture: p77 in summary book
- Nasal bleeding – Nose picking: p82 in summary book
- Bleeding from ear – Position: p87 in summary book
- Skin wounds – Sterile compress/Wound plaster/Bandage: p94 in summary book
- Wound with a foreign object – Not removing object or immobilisation of object: p101 in summary book

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<sup>108</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence, either in favour of manual compression or vascular closing devices.

<sup>109</sup> ES Trauma – Keeping warm: p42 in summary book: There is limited evidence with harm for hypothermia.

<sup>110</sup> ES Trauma – Active rewarming: p51 in summary book: There is limited evidence either in favour of active or passive rewarming.

<sup>111</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

# Skin wounds

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# 1. What is it?

A skin wound is a wound whereby the skin is damaged. As a result the normal cohesion of the various layers of skin is broken. In the case of a deep skin wound the tissues underneath the skin (such as muscles and bones) and even the organs may also be damaged. There are various types of skin wounds, depending on the cause of the injury (for example, a cut, a graze, a stab wound ...). It is important to treat a skin wound properly, so that it doesn't become infected. After all, any damage to the skin increases the risk of infection.

## 2. What do you see?

### 2.1 Graze

A graze is a superficial wound. It can result from a fall, for example. In the event of a graze, only the protective upper layer of skin is shaved off. The wound does not bleed badly: pinpoint spots of blood appear. The wound can be quite painful. There is often dirt in the wound (for example, sand or small stones).

### 2.2 Cut

A wound caused by a sharp object, such as a knife or shard of glass, is called a cut. In the event of a superficial cut, you will see a small incision and minor bleeding. The wound edges are sharply defined. Deep cuts bleed profusely. A deep wound will be visible. However, a cut is not usually very painful.

### 2.3 Burn

The skin and underlying tissues can be burned as a result of heat, electricity, chemical substances, radiation or steam. This causes a burn. A burn requires a different approach to that for other skin injuries. We have therefore dedicated a separate chapter to this topic (see Burns). Extreme cold can even cause a certain type of burn. This is called frostbite (see Problems in heat and cold).

### 2.4 Stab wound

A stab wound is caused by a stabbing or pricking object, for example a screw or a splinter of wood. There is only a tiny visible wound, but the internal damage is difficult to assess. Stab wounds usually only bleed moderately (depending on the site) and are not really painful.

If the pointed object is still in the wound, then depending on the object and its size, it is called a splinter wound (see splinter) or a wound with a foreign object (see A wound with a large foreign object).

### 2.5 Laceration

When the skin is torn, the wound is called a laceration. That can occur, for instance, by getting caught in barbed wire. The wound edge is jagged, which makes healing more difficult. There is a greater chance of scarring. This wound does not usually bleed badly, but can be very painful.

In older people, the skin tears more easily (see Skin tears).

## 2.6 Bite

Bite wounds are caused by animals or people. The bleeding and pain depend greatly on the site of the wound and the intensity with which the bite was inflicted. A bite wound involves a high risk of infection (see Stings and bites).

## 2.7 Gunshot wound

A gunshot wound usually only presents as a very small visible wound. This wound occurs at the site where the bullet penetrates the body (entry wound). The (possible) exit wound is usually bigger. Despite the rather small entry wound, the internal damage can be massive. The nature of the gunshot wound depends on the type of weapon and the type of ammunition used.

# 3. How do you treat a skin wound?

### What do you see?

- + The injured person has a skin wound.

### This is what you should do!

1. Make the area safe
  - + Think of the safety aspects! Have you been able to remove the cause of the skin wound?
  - + Ensure that you don't come into contact with blood or other bodily fluids of the injured person. Wash or disinfect your hands and put on disposal gloves (EB<sup>112</sup>, weak recommendation, low quality evidence; EB<sup>113</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Try to assess the type and severity of the skin wound.
3. Seek help from a specialist
  - + Seek help from a specialist if: (EB<sup>114</sup>, weak recommendation, very low quality evidence)
    - o the bleeding cannot be staunched;
    - o the wound cannot be cleaned properly (there is still dirt in the wound);
    - o it is a gaping wound (the edges of the wound are separated);
    - o it is a laceration;
    - o the injured person has a graze bigger than half of the palm of his hand;

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<sup>112</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>113</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence either in favour of wearing sterile gloves or not wearing gloves. Expert opinion: Experts recommend that the first aider wears gloves when there is a possibility of contact with blood.

<sup>114</sup> ES Skin wounds – Diabetes, swelling, lower extremity wound or contaminated wound: p97 in summary book: There is limited evidence with a harmful effect (increased risk of wound infection) for the following risk factors: jagged wound margin, visible contamination, injury deeper than subcutaneous tissue, foreign body wound, length >5cm, lower extremity laceration, heavy/moderate contamination and diabetes. ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence either in favour of manual compression or vascular closing devices.

Skin wounds

- the injured person has a cut that may need stitching (this is often the case if the cut is longer than 5 cm, but may also be necessary for smaller cuts);
- it is a deep wound;
- the injured person is (probably) not sufficiently protected against tetanus (not vaccinated, booster vaccination too long ago, there is some doubt);
- bones, muscles or other subcutaneous tissues are visible;
- the face, eyes or genitals are injured;
- there is an object in the wound;
- the wound was caused by a bite from an animal or human;
- it is a stab wound caused by a dirty object;
- the wounded person has diabetes or an impaired immune system.

4. Administer further first aid

- + Staunch any bleeding by putting pressure on the wound yourself or letting the injured person do this (EB<sup>115</sup>, weak recommendation, very low quality evidence).
- + Is there tap water in the vicinity? If not, is there other clean water?

<b>Yes. Water is available.</b>	<b>No. There is no water or very little.</b>
<ul style="list-style-type: none"> <li>+ Clean the wound under running water (EB<sup>116</sup>, strong recommendation, moderate quality evidence). Use luke-warm water if possible. Let the water flow directly on to the wound to rinse away the dirt. Clean the wound thoroughly.</li> <li>+ You can also rub the wound gently to remove the dirt, if necessary. Use a sterile compress for this purpose.</li> <li>+ After rinsing, dry the area around the wound, for instance with a towel. Do not touch the wound itself.</li> <li>+ Cover the wound after cleaning, with for example a sterile compress or plaster.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid.</li> </ul>	<ul style="list-style-type: none"> <li>+ Clean the wound with a watery, non-staining disinfectant (EB<sup>117</sup>, weak recommendation, moderate quality evidence).</li> <li>+ Spray it over the wound or dab it on with a compress. You can rub the wound gently to remove the dirt, if necessary. If the wound is very dirty, you should regularly use a new compress and use sufficient disinfectant.</li> <li>+ Disinfect the wound one last time with a clean compress.</li> <li>+ After disinfecting, dry the area around the wound, for instance with a towel. Do not touch the wound itself.</li> <li>+ Cover the wound after disinfecting, with for example a sterile compress or plaster.</li> <li>+ Take off your disposable gloves and disinfect your hands with alcohol rub after administering first aid (EB<sup>118</sup>, strong recommendation, very low quality evidence).</li> </ul>

<sup>115</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence, either in favour of manual compression or vascular closing devices.

<sup>116</sup> ES Cuts and grazes – Irrigating with water: p89 in summary book: There is limited evidence either in favour of tap water or saline.

<sup>117</sup> ES Skin wounds – Disinfectant solution: see appendix 1: There is evidence in favour of povidone-iodine solution.

<sup>118</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

When administering further first aid to the wound, try to use bandaging that does not stick to the wound. Change the bandage regularly and observe how well the wound is healing. It is normal for the skin around the wound to look slightly red and for a little clear liquid to seep from the wound at first. Refer the injured person to a general practitioner if there are signs of infection (see An infected wound).

A wound heals faster if it is covered, preferably in a moist wound climate (and on condition that it is cleaned properly in advance). If a wound stays exposed to the air, it will dry to form a crust. This results in slower healing (moisture helps the epithelial cells to migrate, and contains growth factors and enzymes that ensure a speedy recovery).

## 4. An infected wound

### What do you see?

- + The injured person has a painful, red skin wound that is swollen. The area around the wound feels warm.
- + There is sometimes pus visible in the wound (purulent exudate).
- + The wound may give off an abnormal odour.
- + The injured person may have a fever.
- + Other painful swellings (infected lymph nodes) or a red stripe (infected lymph ducts) may be visible around the wound.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>119</sup>, weak recommendation, low quality evidence; EB<sup>120</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Try to assess the type and severity of the skin wound.
3. Seek help from a specialist
  - + Seek help from a specialist if you suspect an infected wound.
4. Administer further first aid
  - + Disinfect the wound with a watery, non-staining disinfectant.
  - + Cover the wound with a sterile bandage.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>119</sup>, strong recommendation, low quality evidence).

### Preventing a wound infection

- + Good hand hygiene on the part of the first aider and proper treatment can prevent many wound infections. Therefore, always wash or disinfect your hands before and after giving first aid. Put on disposable gloves to prevent contact with the blood or other bodily fluids of the injured person.

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<sup>119</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>120</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence either in favour of wearing sterile gloves or not wearing gloves. Expert opinion: Experts recommend that the first aider wears gloves when there is a possibility of contact with blood.

- + Make sure that you are vaccinated against tetanus (see Tetanus). This vaccination protects against tetanus, but not against a wound infection. Good hygiene and proper wound treatment are therefore still essential.
- + Risk factors for a wound infection are: (EB<sup>121</sup>, very low quality evidence)
  - o a wound that cannot be properly cleaned;
  - o a laceration;
  - o a graze that is bigger than half of the injured person's palm;
  - o a cut that is longer than 5 cm;
  - o a wound that contains a foreign object:
  - o a stab wound caused by a dirty object;
  - o a wound to a person who has diabetes or an impaired immune system.

## 4.1 Tetanus

### What do you see?

- + The injured person has (had) a skin wound.
- + There is some doubt as to whether the injured person is sufficiently protected against tetanus (he is not vaccinated or the booster vaccination was too long ago).
- + The injured person's jaw muscles are stiffening.
- + The injured person exhibits cramped facial muscles (sardonic grin or risus sardonius).

### This is what you should do!

As a first aider there are not many actions you can take when you suspect tetanus in a person. The injured person needs to seek help from a specialist.

### Tetanus prevention

- + The bacteria that cause tetanus are impossible to eliminate. Contracting and surviving the disease offers no protection in case of a new contamination. There is no build-up of immunity. That's why it is vital to start with basic vaccination at a young age and have booster vaccinations on time. You can be vaccinated with a vaccine that contains inactivated tetanus anatoxin. The vaccine is only available as a combination vaccine. This combined vaccine protects against tetanus, diphtheria (see Diphtheria) and whooping cough (see Whooping cough). The tetanus vaccination is included in the basic programme of vaccinations for children.
  - o A complete basic tetanus vaccination for an adult consists of three injections. The second injection is administered 4 to 6 weeks after the first, and the third approximately 6 months to 1 year after the second.
  - o After a complete basic vaccination, booster vaccinations are administered every 10 years for life. More frequent booster vaccinations increase the risk of side effects.
  - o If the last injection, in someone who has been fully vaccinated in the past, was longer than 20 years ago, it is not necessary to start with the complete basic vaccination again, but it is recommended to have two injections 6 months apart (the second injection is necessary to guarantee proper long-term protection).

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<sup>121</sup> ES Skin wounds – Diabetes, swelling, lower extremity wound or contaminated wound: p97 in summary book: There is limited evidence with a harmful effect (increased risk of wound infection) for the following risk factors: jagged wound margin, visible contamination, injury deeper than subcutaneous tissue, foreign body wound, length >5cm, lower extremity laceration, heavy/moderate contamination and diabetes.

You can drastically reduce the risk of tetanus by treating every wound properly.

- + The three-fold combination vaccine (tetanus, diphtheria and whooping cough) is administered **free of charge** by a doctor in Flanders.

## 4.2 Gangrene

### What do you see?

- + The injured person has a skin wound that is dark in colour, initially painful to touch and thereafter becomes painless (due to the nerve ends dying off).
- + The area around the wound is swollen.
- + In the case of wet gangrene you may notice pus and an unpleasant smell.
- + In the case of gas gangrene you will feel the gas bubbles crackling when you press the skin (crepitus, as if you are treading on snow).

### This is what you should do!

As a first aider there are not many actions you can take when a person has gangrene. The injured person urgently needs to seek help from a specialist.

# 5. Some specific skin wounds

## 5.1 Blisters resulting from friction

### What do you see?

There is a blister on the hand or foot, or it has burst.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>122</sup>, weak recommendation, low quality evidence; EB<sup>123</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o there are signs of infection (see An infected wound);
    - o the injured person suffering from the blister is a diabetic or has an impaired immune system. In these cases, there is an increased risk of difficult wound.
4. Administer further first aid
  - + If the blister is not bothersome, leave it intact. This will help prevent infection (EB<sup>124</sup>, weak recommendation, very low quality evidence).

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<sup>122</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>123</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves.

<sup>124</sup> ES Friction blisters – Deroofing or aspiration: p462 in summary book: There is limited evidence in favour of keeping a blister intact.

- + If the blister is causing a problem or there is a chance that it will burst spontaneously, administer further first aid:
  - o If the blister is open, treat the wound as if it were a skin wound.
  - o If the blister is not open, prick it open.
- + You can cover the blister with a second skin plaster.
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>128</sup>, strong recommendation, low quality evidence).

### Prevention of blisters caused by friction

- + If you are going for a long walk, you can reduce the risk of blisters by first putting on a thin sock and then a thick woollen sock. Polyester socks also reduce the chance of blisters (EB<sup>125</sup>, weak recommendation, low quality evidence).
- + There are products (sprays, creams, plasters) for feet that sometimes help prevent blisters (EB<sup>126</sup>, weak recommendation, low quality evidence). You can use a second skin plaster to protect the skin. Ask your general practitioner or pharmacist for advice.
- + Make sure your shoes have been well run in, before going on a long walk.
- + Make sure that your shoes and socks are dry and remain so. Dry feet have less chance of getting blisters (EB<sup>127</sup>, weak recommendation, low quality evidence).

## 5.2 A wound containing a foreign object

### 5.2.1 Large foreign object

#### What do you see?

The injured person has a wound in which there is a relatively large foreign object (for example, a piece of glass).

#### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>128</sup>, weak recommendation, low quality evidence; EB<sup>129</sup>, weak recommendation, very low quality evidence).
  - + Always leave the object where it is. Any attempt to remove it could cause additional harm.
2. Assess the condition of the injured person.
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if there is a large foreign object protruding from the wound.
4. Administer further first aid
  - + Talk to the injured person: explain why you are not going to remove the foreign object.

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<sup>125</sup> ES Friction blisters – Specific socks: p465 in summary book: There is limited evidence in favour of wearing specific socks. Polyester socks, a prototype boot sock with liner or two pair of socks significantly decrease the risk of foot blisters.

<sup>126</sup> ES Friction blisters – Specific products (cream/spray/plaster): p468 in summary book: There is limited evidence in favour of using a spray (antiperspirant).

<sup>127</sup> ES Friction blisters – Dry socks/shoes: p470 in summary book: There is limited evidence in favour of dry feet.

<sup>128</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>129</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence either in favour of wearing sterile gloves or not wearing gloves.

- + Make sure that the object cannot move.
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>130</sup>, strong recommendation).

## 5.2.2 Splinter

### What do you see?

The injured person has a wound containing a splinter. Sometimes it is difficult to see the splinter.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>130</sup>, weak recommendation, low quality evidence; EB<sup>131</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the end of the splinter is not very visible and you cannot remove the splinter;
    - o the splinter breaks off while being removed;
    - o the splinter is made of tropical hardwood (e.g. bankirai, okan...) because some kinds of wood can cause allergic reactions;
    - o it is metal splinter (which can break off) or a glass splinter (whereby it is difficult to know if there are still bits left in the skin);
    - o there are signs of infection in the splinter wound (see An infected wound);
    - o the splinter is in or around the eye;
    - o the injured person is (probably) not sufficiently protected against tetanus (not vaccinated, booster vaccination too long ago, there is some doubt);
    - o it is a large splinter (you might exacerbate the injury by removing the splinter yourself); treat a large splinter like a large foreign object (see Large foreign object).
4. Administer further first aid
  - + In the case of a small splinter, where the end is visible, and for which you do not need to seek help from a specialist (as mentioned above under step 3 'Seek help from a specialist'), try to remove it yourself.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>130</sup>, strong recommendation, low quality evidence).

### Preventing splinters

- + Wear protective equipment (gloves, safety goggles) when doing-it-yourself or working in the garden.
- + If your job entails an increased risk of splinters (for example, in metal or wood processing), follow the proposed safety measures.
- + Check wooden toys (swings, slide ...) regularly. Keep them in good condition (sand and varnish rough areas).
- + Wear shoes or slippers, especially on wooden floors.

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<sup>130</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing

<sup>131</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence either in favour of wearing sterile gloves or not wearing gloves.

- + Never clear up shards with your bare hands.

## 5.3 A wound caused by a zip

### What do you see?

- + The injured person's skin is caught in a zip.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>132</sup>, weak recommendation, low quality evidence; EB<sup>133</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o it is not possible to free the skin;
    - o the injured person has a skin wound after the skin has been freed.
4. Administer further first aid
  - + Free the skin from the zip:
    - o If the skin is stuck between the mechanism of the zip, you can try and loosen it with a screwdriver.
    - o If the skin is stuck between the zip teeth, you can loosen them using a pair of scissors (EB<sup>134</sup>, weak recommendation, low quality evidence).
  - + Treat any arisen skin wound (see How to treat a skin wound).
  - + Take off your disposable gloves and wash your hands after administering first aid.

## 5.4 A gunshot wound

### What do you see?

- + The injured person has a gunshot wound. You can see an entry wound. Sometimes you will also see an exit wound.
- + An **entry wound**:
  - o The injured person has a small, sharply defined wound (from a bullet or projectile) or has several small wounds spread out (from a shotgun).
  - o An entry wound does not bleed severely. The skin and blood vessels are initially cauterized by the heat of the projectile.
  - o Depending on the distance from which the injured person was shot, powder residue may sometimes be visible.
- + An **exit wound**:
  - o If a projectile exits the body, this usually creates a large, jagged wound.

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<sup>132</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing

<sup>133</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence either in favour of wearing sterile gloves or not wearing gloves.

<sup>134</sup> ES Zipper injury – Cutting zipper crosswise: p104 in summary book: There is limited evidence in favour of cutting the closed zipper teeth at any position to unzip the remaining zipper. This results in a decreased elapsed time to release the zipper. The expert panel has decided to retain the screwdriver method, since this is probably the least painful.

- There is more blood here than at the entry wound.

### **This is what you should do!**

1. Make the area safe
  - + Call the emergency services immediately on 112 if there has been a shooting incident with malicious intent.
  - + Only administer first aid to the injured person if you can do so without putting yourself at risk!
  - + Make sure that the incident cannot repeat itself. Check to see if the perpetrator has been disarmed, or if the weapon has been discharged. Never try to disarm an armed perpetrator on your own; leave this to the police.
  - + Put on disposable gloves (EB<sup>135</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing.
3. Seek help from a specialist
  - + Call the emergency services on 112.
4. Administer further first aid
  - + Put direct pressure on the most severely bleeding wound(s) with your hands. If you have a compress or clean cloth, place this on the wound(s) and press on it.
  - + Place a bandage on the entry and exit wound.
  - + Depending on the part of the body that has been shot, you may sometimes be in a position to administer specific first aid (see Chest wound, see Abdominal injury and see Head injury).
  - + Check the injured person's consciousness and breathing every minute.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>136</sup>, strong recommendation, low quality evidence).

## **5.5 Skin tears**

### **What do you see?**

- + The injured person (often an older person) has a skin wound. The skin around the wound is wrinkly and fragile.
- + Skin tears have various appearances or forms:
  - sometimes the wound is straight, as if an incision has been made;
  - sometimes the wound looks like a flap of skin;
  - sometimes there is no longer a skin flap and you can see the lower layers of skin (the wound looks red).

### **This is what you should do!**

1. Make the area safe

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<sup>135</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that first aiders wear gloves in the event of possible contact with blood.

<sup>136</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

- + Wash your hands and put on disposal gloves (EB<sup>137</sup>, weak recommendation, low quality evidence; EB<sup>138</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
    - + Find out what is wrong with the injured person.
  3. Seek help from a specialist
    - + Always seek help from a specialist.
  4. Administer further first aid
    - + Treat the skin very carefully to avoid causing any additional tears.
    - + Do not cut the loose skin away.
    - + Rinse the wound with water. Do not rub the wound in the process.
    - + Make sure that the wound remains moist by covering it with a compress that you have made wet (with water or with a watery, non-staining disinfectant if there is no water available).
    - + Do not use plasters (the skin may tear when these are removed); use a bandage instead.
    - + Take off your disposable gloves and wash your hands after administering first aid. (EB<sup>137</sup>, strong recommendation, low quality evidence)

## 5.6 A high-pressure injury

### What do you see?

- + The injured person usually has a small wound.
- + The area around the injury may discolour and swell up.
- + If the wound is to the limbs, there is pain and function loss in the limb in question. This is sometimes accompanied by numbness.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>137</sup>, weak recommendation, low quality evidence; EB<sup>138</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Always seek help from a specialist. Do not underestimate the severity of a high-pressure injury.
4. Administer further first aid
  - + If necessary, staunch severe bleeding.
  - + Cool any burns with water.
  - + Cover the wound.
  - + Take off your disposable gloves and wash your hands after administering first aid.

### Preventing a high-pressure injury

- + Only use high-pressure equipment if you have been properly trained to do so.
- + Respect all the safety regulations (helmet, safety goggles, gloves and instructions for use).
- + Never aim the nozzle at anyone else, not even at yourself (for example, when checking if there is a blockage).

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<sup>137</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>138</sup> ES Wound management – Wearing gloves for bleeding effect for patients: p34 in summary book: There is limited evidence either in favour of wearing sterile gloves or not wearing gloves.

## Skin wounds

- + Never check for a leak in a high-pressure cable with your hand. After all, a minuscule jet under high pressure can pierce your skin.

### Summaries made for topics for which no evidence could be identified:

- Skin wounds – Sterile compress/wound plaster/bandage: p94 in summary book
- Skin wounds – Timing sterile compress/wound plaster: p96 in summary book
- Friction blisters – Compeed: p464 in summary book
- Wound with a foreign object – Not removing object or immobilisation of object: p101 in summary book
- Splinter – Removing with forceps or needle: p103 in summary book

# Burns

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# 1. How do you determine the severity?

The following factors play a role in determining how you should evaluate the severity of a burn:

- + the depth (degree) of the burn;
- + the surface area that is burned;
- + the location of the burn;
- + the cause of the burn;
- + the age of the injured person.

## 1.1 The depth (degree) of the burn

The deeper the burn, the more severe it is. A first degree burn is less severe than a third degree burn. All third degree burns are severe (EB<sup>139</sup>, weak recommendation, very low quality evidence).

## 1.2 The surface area that is burned

The severity of the burn does not depend exclusively on the degree. The burned surface area also plays a role: the larger the burn, the more severe it is (EB<sup>140</sup>, weak recommendation, very low quality evidence). There is an increased risk of infection, and more chance of serious fluid loss ...

A burn is considered severe if it covers more than 5% of the total body surface area of the injured person. Burns that cover more than 10% of the total surface area of the injured person's body can even be life-threatening. In children, burns that cover more than 5% of the body surface can be life-threatening.

In order to estimate the size of a burn, it is best to compare it to the size of the injured person's hand. The size of the hand (palm and closed fingers together) corresponds to approximately 1% of the total body surface area of the injured person.

## 1.3 The location of the burn

The location of the burn also determines the severity of the injury. Burns in the mouth and throat are always life-threatening, however small they are. This is because when the tissue swells, there is a risk of choking (EB<sup>141</sup>, weak recommendation, very low quality evidence). Burns to the face, ears, hands, feet, joints or genitals are also severe because of the risk of scarring and loss of function. In addition, any deep burn running completely around the neck, torso or a limb, is serious. This is because the swelling of tissue can hinder blood circulation. This is a serious situation and requires emergency medical assistance.

## 1.4 The cause of the burn

The cause of the burn is a defining factor in its severity. Burns caused by chemical products are always severe because, in addition to burns, other injuries may occur, including through the absorption of chemical substances via the bloodstream. It should also be mentioned that chemical burns continue to burn until the chemical product is completely removed.

In the case of a burn caused by electricity, the severity is not usually easy to assess because much of the injury will be internal (EB<sup>142</sup>, weak recommendation, very low quality evidence).

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<sup>139</sup> ES Burns – Risk factors: p122 in summary book: There is limited evidence with harm for deep burns, for full thickness burns  $\geq 30\%$  and for 2<sup>nd</sup> and 3<sup>rd</sup> degree burns.

<sup>140</sup> ES Burns – Risk factors: p122 in summary book: There is limited evidence with harm for total surface area burned.

<sup>141</sup> ES Burns – Risk factors: p122 in summary book: There is limited evidence with harm for inhalation injury.

<sup>142</sup> ES Burns – Risk factors: p122 in summary book: There is limited evidence with harm for electrical burns.

Burns caused by flames are often deep (third degree burns) (EB<sup>143</sup>, weak recommendation, very low quality evidence).

## 1.5 The age of the injured person

The age of the injured person is important for determining whether or not you need to seek help from a specialist. In the case of children younger than 5 years or adults older than 60, it is best to always do this (EB<sup>144</sup>, weak recommendation, very low quality evidence).

# 2. How do you treat a burn?

### What do you see?

The injured person has a first, second or third degree burn.

### This is what you should do!

1. Make the area safe
  - + Think of the safety aspects. Has the cause of the burn been removed?
  - + Ensure that you do not come into contact with blood or other bodily fluids of the injured person. Wash your hands and put on disposal gloves (EB<sup>145</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + If necessary, check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing.
  - + Try to assess the severity of the burn.
3. Seek help from a specialist
  - + Seek help from a specialist if you are confronted with:
    - o first or second degree burns whereby 5 to 10% of the body's surface is burned;
    - o third degree burns whereby less than 5% of the body's surface is burned;
    - o burns in children younger than 5 years or in adults older than 60 years (EB<sup>144</sup>, weak recommendation, very low quality evidence).
  - + Call the emergency services on 112 if you are confronted with:
    - o first or second degree burns whereby more than 5 to 10% of the body's surface is burned;
    - o third degree burns whereby more than 5% of the body's surface is burned;
    - o burns in children younger than 1 year or adults older than 75 years (EB<sup>144</sup>, weak recommendation, very low quality evidence);
    - o burns in the mouth and throat (EB<sup>146</sup>, weak recommendation, very low quality evidence);
    - o burns in functional areas (face, eyes, hands, feet, joints, genitals) and circular wounds (completely around a limb);
    - o electrical burns (EB<sup>147</sup>, weak recommendation, very low quality evidence);

<sup>143</sup> ES Burns – Risk factors: p122 in summary book: There is limited evidence either for the benefit/harm of burn accidents with flame or other causes of burns.

<sup>144</sup> ES Burns – Risk factors: p122 in summary book: There is limited evidence with harm for older age (≥50-60 years).

<sup>145</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>146</sup> ES Burns – Risk factors: p122 in summary book: There is limited evidence with harm for inhalation injury.

<sup>147</sup> ES Burns – Risk factors: p122 in summary book: There is limited evidence with harm for electrical burns.

- chemical burns.
4. Administer further first aid
- + First water, the rest comes later! Cool all burns as quickly as possible with cool or luke-warm water, for example from the tap or shower (EB<sup>148</sup>, strong recommendation, low quality evidence)
    - Direct the jet of water a few centimetres above the burn and let the water flow down over the burn. After all, it is painful for the injured person if the jet of water is directed straight at the burn.
    - Ensure that the injured person does not become hypothermic. This is a risk if you have to cool extensively and over a prolonged period (for example, in the case of large burns). For this reason, do not use ice cold water and keep the injured person warm after cooling.
    - Never put ice on a burn! This can exacerbate the tissue damage (EB<sup>149</sup>, weak recommendation, very low quality evidence).
    - Cool the burn for at least 10 minutes. Keep cooling until the pain eases off (EB<sup>150</sup>, strong recommendation, low quality evidence).
  - + Always remove clothing and jewellery if they are not stuck to the skin. If they are stuck to the skin, leave them alone.
  - + Do not burst any blisters! That can cause infection (EB<sup>151</sup>, strong recommendation, low quality evidence). Because of the burn, the protective function of the skin is lost, which enables microorganisms to enter the body. The recovery time would therefore be extended.
  - + Ask the injured person if they have had a tetanus vaccination (see Tetanus).
  - + Look out for symptoms of poisoning. Fire can be accompanied by the release of noxious gases (see Poisoning by inhalation).
  - + Treat according to the severity of the burn.
    - Is it a small first degree burn? Apply a moisturising product and cover the wound with the appropriate bandaging material.
    - Is it a small second degree burn, whereby the skin is still intact? Cover the wound with a bandage specially designed for use on burns. Please note: products that contain an antibiotic can only be used with a doctor's prescription.
    - Is it a large second or a third degree burn? Then specialized help is required. Check whether the emergency services have been alerted, or seek help from a specialist yourself. After cooling, place a wet bandage on the burn (for example, a triangular bandage, a compress or a clean cloth). Make sure to do this as sterile and clean as possible. You can also use cling film to cover the burn temporarily. These techniques are intended to cover a wound temporarily, during transport to specialized help.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>152</sup>, strong recommendation, low quality evidence).

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<sup>148</sup> ILCOR FA 770: Cooling of burns: We recommend that first aid providers actively cool thermal burns. Forms of active cooling evaluated in this review included cool/cold nonfreezing water and mechanical devices (eg, cold probes, cooled gel pads), but there is no evidence to recommend a specific temperature or method of cooling.

<sup>149</sup> ES Burns – Ice: p109 in summary book: There is limited evidence in favour of cold water compared to ice.

<sup>150</sup> ILCOR FA 770: Cooling of burns: Active cooling should take place as soon as possible for a minimum of 10 minutes.

<sup>151</sup> ES Burns – Deroofing or aspiration: p107 in summary book: There is limited evidence in favour of keeping a blister intact.

<sup>152</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

## 3. Specific burns

### 3.1 Respiratory tract burns

#### What do you see?

- + The injured person is coming out of a burning building or car.
- + The injured person experiences difficulty breathing and sometimes speaks with a hoarse voice.
- + There may be signs on the injured person's face of burns to the airways:
  - o soot traces in and around the nose or mouth;
  - o scorching of eyebrows, eyelashes, nasal hairs, moustache, beard or head hair;
  - o visible burns on face or mouth.
- + There may also be signs indicating CO poisoning or poisoning by other gases.

#### This is what you should do!

1. Make the area safe.
  - + Think of the safety aspects. Has the cause of the burn been removed? Ask what happened. There may be other injured persons. Try to prevent the fire from spreading.
  - + Wash your hands and put on disposal gloves. (EB<sup>152</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence)
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing. Check breathing even if the injured person is unconscious.
3. Seek help from a specialist
  - + Call the emergency services immediately on 112. Tell them that there is a fire.
4. Administer further first aid
  - + Let the injured person to get into a position that is the most comfortable for him (sitting, crouching or standing). People experiencing breathing problems often find that it is easiest to sit leaning over with their elbows on the table (EB<sup>153</sup>, weak recommendation, low quality evidence).
  - + Loosen clothing and jewellery if they are obstructing breathing.
  - + Check the injured person's breathing every minute.
  - + Cool any external burns if necessary (EB<sup>154</sup>, strong recommendation, low quality evidence).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>152</sup>, strong recommendation, low quality evidence).

### 3.2 Eye burns

#### What do you see?

- + The injured person has suffered burns to the skin around the eye.
- + The eyelashes and eyebrows may be scorched.

<sup>153</sup> ES Dyspnea - Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

<sup>154</sup> ILCOR FA 770: Cooling of burns: We recommend that first aid providers actively cool thermal burns. Forms of active cooling evaluated in this review included cool/cold nonfreezing water and mechanical devices (eg, cold probes, cooled gel pads), but there is no evidence to recommend a specific temperature or method of cooling.

- + The eyes are bloodshot.
- + Membranes may be visible on the eyeball.

### This is what you should do!

1. Make the area safe
  - + Think of the safety aspects. Has the cause of the burn been removed?
  - + Wash your hands and put on disposal gloves (EB<sup>155</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing if necessary.
3. Seek help from a specialist
  - + Seek help from specialist help if the injured person is fully conscious.
  - + Call the emergency services on 112 if the injured person shows signs of impaired consciousness.
4. Administer further first aid
  - + Rinse the burned eye with plenty of luke-warm water, preferably with an eye rinse bottle, eye fountain or under the shower (EB<sup>156</sup>, weak recommendation, very low quality evidence). If the wound is caused by a chemical product, take care not to let the rinsing water come into contact with the other eye. Also, avoid contact with the rinsing water yourself.
  - + While rinsing, gently spread apart the eyelids so that the eyeball and inside of the eyelids can also be rinsed. This is not easy, because the eye is painful and the injured person will close his eyes tightly in reflex.
  - + Do not apply any ointment or other products to the eye without the advice of a doctor or ophthalmologist.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>155</sup>, strong recommendation, low quality evidence).

## 3.2.1 Arc-eye and snow blindness

### What do you see?

- + The injured person has painful, watering eyes and an abrasive feeling when blinking or moving the eyes. The injured person's eyes are red.
- + He often keeps the eyelids tightly shut.

### This is what you should do!

1. Make the area safe.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Refer the injured person to a doctor or ophthalmologist. Point out that the injured person must be accompanied, or go with the injured person yourself (he can, for instance, not drive a car himself).

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<sup>155</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>156</sup> ILCOR FA 540: Eye chemical injury: irrigation: We suggest that first aid providers use continuous, large volumes of clean water for irrigation of chemical eye injuries.

4. Administer further first aid
  - + Reassure the injured person: this kind of injury usually heals spontaneously within 24 to 48 hours.
  - + Advise the injured person to protect his eyes and rest them as much as possible by:
    - o wearing sunglasses; (EB<sup>157</sup>, weak recommendation, very low quality evidence)
    - o keeping the eyes closed as much as possible;
    - o covering both eyes with wet compresses (without putting pressure on the eye).
  - + Pay enough attention to psychosocially support the injured person: give plenty of information, stay with him, explain what is in his surroundings ...

### Preventing snow blindness and arc-eye

- + When in the snow, wear good sunglasses with an EU hallmark and indication of UV-filter. The glasses should be sufficiently large to protect the eyes at the bottom, the top and the sides from direct and indirect radiation (EB<sup>157</sup>, weak recommendation, very low quality evidence).
- + When welding, wear suitable welding glasses that cover the eyes completely, and warn bystanders. Make sure they also protect their eyes (EB<sup>157</sup>, weak recommendation, very low quality evidence).
- + Turn away your eyes if you happen to be in the vicinity of welding work.

## 3.2.2 Irritating sprays

### What do you see?

#### In the event of atomisation from a distance:

- + The injured person's eyes are painful and watering profusely and are painful.
- + The injured person complains about a stinging throat and coughs frequently.
- + The injured person may have difficulty breathing even after some time has elapsed. Susceptible individuals may experience an asthma attack, particularly if they have come into contact with the spray in a confined space.

#### In the event of direct spray from less than one metre away:

- + The injured person's eyes are watering profusely and very painful (there is a risk of a burned cornea). The skin around the eyes (especially the day after) can be red and very swollen.
- + The stinging throat, the coughing and the breathing difficulties are very pronounced.
- + The skin is very irritated and painful. There are sometimes blisters on the skin (for example, in young children).
- + The injured person may feel nauseous and may vomit.

### This is what you should do!

1. Make the area safe
  - + Immediately leave the area in which the irritating spray was used. Advise everyone to leave the area.
  - + Wash your hands and put on disposable gloves (EB<sup>158</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).

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<sup>157</sup> ES Snow blindness/Arc-eye – Sunglasses/welding glasses: p132 in summary book: There is limited evidence in favour of eye protection.

<sup>158</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

2. Assess the injured person's condition
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing.
3. Seek help from a specialist
  - + In the event of atomisation from a distance: refer the injured person to a doctor if he is having difficulty breathing.
  - + In the case of direct spray from less than a metre away: refer the injured person to a doctor.
4. Administer further first aid
  - + In the case of atomisation from a distance: advise the injured person to take a shower, wash their hair and change clothes.
  - + In the event of direct spray from less than one metre away:
    - o Tell the injured person to take off the contaminated clothing. Put the clothing in a plastic bag and seal it.
    - o Rinse the eyes with plenty of water (EB<sup>159</sup>, weak recommendation, low quality evidence; EB<sup>160</sup>, weak recommendation, moderate quality evidence).
    - o Clean the skin with a greasy cream (baby oil, cleansing milk). Dab small parts of the skin with a compress and take a new compress each time to avoid spreading the irritating product. Avoid contact with the eyes.
    - o Wash the hair with shampoo.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>158</sup>, strong recommendation, low quality evidence).
  - + Ventilate the room thoroughly after administering first aid. The room will then have to be cleaned thoroughly with water and detergent. Do not forget to clean curtains and carpets, otherwise the stinging effect will not go away.

## 3.3 Chemical burn

### What do you see?

- + The injured person has an irritation or a burn on the skin after coming into contact with a chemical product.
- + The skin may be discoloured or swollen.
- + Blisters sometimes appear and bits of skin may even come loose.

### This is what you should do!

1. Make the area safe
  - + Wash your hands (EB<sup>161</sup>, strong recommendation, low quality evidence).
  - + Avoid coming into contact with the chemical product yourself by:
    - o putting on (industrial) gloves that offer protection against the product;
    - o wearing safety glasses to prevent splashes to the eyes;

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<sup>159</sup> ILCOR FA 540: Eye chemical injury: irrigation: We suggest that first aid providers use continuous, large volumes of clean water for irrigation of chemical eye injuries.

<sup>160</sup> ES Pepper Spray – decontamination with tap water and other products: p135 in summary book: There is limited evidence either in favour of tap water combined with antacid, lidocaine, milk of baby shampoo or tap water only. Expert opinion recommends taking a shower, washing hair and changing clothes.

<sup>161</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

- ventilating the room and closing the packaging. Some products give off hazardous fumes.
2. Assess the condition of the injured person
    - + Find out what is wrong with the injured person.
    - + Check whether the injured person is conscious.
    - + Open the airway and check the injured person's breathing if necessary.
  3. Seek help from a specialist
    - + Call the emergency services on 112 if there are severe symptoms (for example, loss of consciousness or breathing difficulties) or if the condition of the injured person deteriorates.
    - + Call the Anti-Poison Centre on 070 245 245. Do not wait for symptoms to appear.
  4. Administer further first aid
    - + Adhere strictly to the advice given by the Anti-Poison Centre.
    - + Rinse the skin with plenty of water for a prolonged period, preferably under a shower. You do not need to remove the injured person's clothing for this purpose. Rinse the eyes as well if necessary (see Eye burn).
    - + While rinsing, remove any clothing and jewellery that are not stuck to the skin. Do not rub the affected skin.
    - + Put the clothing in a plastic bag and seal it.
    - + Do not apply any ointments or other products to the skin without the advice of specialists.
    - + Do not burst any blisters (EB<sup>162</sup>, strong recommendation, low quality evidence).
    - + After rinsing the burn, apply a wet bandage (for example, a clean cloth).
    - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>163</sup>, strong recommendation, low quality evidence).

### Preventing burns from chemical products

- + Always read the safety instructions of products before using them.
- + Comply with all the safety regulations (safety glasses, gloves).
- + Keep chemical products (such as household products or painting essentials) in a safe place, out of the reach of children. Never pour them into empty water or soft drinks bottles.
- + Close bottles containing chemical products immediately after use and put them away.
- + Make sure there is suitable first aid equipment (shower, eye rinse bottle) and ensure that people working with chemical products are familiar with first aid. The faster the first aid is administered, the smaller the chance of a severe burn.

## 3.4 Electrical burn

### What do you see?

- + The injured person has had an accident involving electricity.
- + The injured person has burns on the body.
- + The injured person is in pain and has sensory impairment (tingling) in the limb that came into contact with the electrical source.
- + The injured person may be unconscious.
- + The injured person may suffer a cardiac arrest.

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<sup>162</sup> ES Burns – Deroofing or aspiration: p107 in summary book: There is limited evidence in favour of keeping a blister intact.

<sup>163</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

### This is what you should do!

1. Make the area safe
  - + Think of the safety aspects. Observe the situation thoroughly. Ask what happened. Do not touch an injured person, if he is still in contact with a power supply (see Electrical accident)! Switch off the power as quickly as possible. If that is not possible, try to remove the injured person from the power supply (see Electrical accident).
  - + Wash your hands and put on disposal gloves (EB<sup>164</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services on 112 in the event of severe injuries.
  - + Refer the injured person to a doctor in the event of minor injuries.
4. Administer further first aid
  - + Treat the burns (see How to treat a burn?).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>164</sup>, strong recommendation, low quality evidence).

## 3.5 Sunburn

### What do you see?

- + The injured person has angry red skin and pain in the burnt zone(s). This can occur a long time after being burned.
- + Small or bigger fluid-filled blisters can occur on the skin (later).
- + The injured person may experience a slight rise in body temperature.
- + The injured person may feel nauseous.

### This is what you should do!

1. Make the area safe
  - + Wash your hands. Put on disposal gloves if there are fluid-filled blisters on the injured person's skin (EB<sup>164</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Refer the injured person to a specialist if:
    - o large blisters are forming;
    - o the injured person is a young child;
    - o there are symptoms of sun stroke (see Heat and sun stroke) or dehydration (see Dehydration);
    - o the injured person feels unwell.
4. Administer further first aid
  - + Take the injured person into the shade (preferably inside).

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<sup>164</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

- + Cool the skin with wet cloths or a gentle shower. Avoid using very cold water, so that the injured person does not become hypothermic (EB<sup>165</sup>, strong recommendation, low quality evidence).
- + Gently dab the skin dry.
- + Apply a moisturising product to the burnt skin. Repeat as necessary (EB<sup>166</sup>, strong recommendation, moderate quality evidence).
- + Advise the injured person:
  - o to wear light, non-abrasive and non-tight clothing;
  - o to take regular sips of cold water (or another cold drink).
- + If the injured person is in pain, he can take a simple painkiller. Read the package leaflet of the painkillers.
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>167</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).

### Preventing sunburn

- + Avoid too bright or direct sunlight. Stay out of the sun between 11 am and 3 pm as much as possible. Follow the weather forecasts and know your skin type, so that you can follow the recommendations about the UV-index.
- + Wear loose clothing and a hat. A sunshade alone will not provide enough protection against sunburn.
- + Let babies and young children play in the shade where possible. Cover them thoroughly with a sunblock (sunscreen with the highest protection rating), even if they are sitting underneath a sunshade (EB<sup>168</sup>, strong recommendation, low quality evidence). Protect their head with a sunhat. UV-protective clothing is also available (hats, t-shirts, ...).
- + Wear sunglasses with UV-resistant glass and a EU hallmark. The glasses must be sufficiently big so that your eyes are protected against direct and indirect radiation (from above, under and sides of the sunglasses) (EB<sup>169</sup>, weak recommendation, very low quality evidence).
- + Use a sunscreen with a high protection rating (at least factor 15), that will protect you against UVA and UVB (EB<sup>168</sup>, strong recommendation, low quality evidence). Take note of the following:
  - o Apply a good layer of sunscreen 15 to 30 minutes before you go into the sun on all unprotected areas of the body.
  - o Use enough cream to cover yourself properly. Do not forget the skin at the edges of your clothing (for example, your neck or the edge of your trousers).
  - o Reapply sunscreen at least every 2 to 3 hours. This is because, after you have been lying on a towel or on the sand, some of the sunscreen will have rubbed off.
  - o Use a water-resistant sunscreen when swimming. Reapply it when you have come out of the water. When drying yourself, you may wipe off the sunscreen.

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<sup>165</sup> ILCOR FA 770: Cooling of burns: We recommend that first aid providers actively cool thermal burns. Forms of active cooling evaluated in this review included cool/cold nonfreezing water and mechanical devices (eg, cold probes, cooled gel pads), but there is no evidence to recommend a specific temperature or method of cooling.

<sup>166</sup> ES Sunburn – Hydration: p140 in summary book: There is limited evidence in favour of after sun lotion/gel/cream.

<sup>167</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>168</sup> ES Sunburn – Sunscreen: p145 in summary book: There is limited evidence in favour of sunscreen.

<sup>169</sup> ES Snow blindness/Arc-eye – Sunglasses/welding glasses: p132 in summary book: There is limited evidence in favour of eye protection.

- + If you want to use sunscreen as well as insect spray, it is best to apply the sunscreen first. Let it work in for about 1 hour, and then apply the insect spray. Insect spray reduces the protection offered by sunscreen against sunburn (EB<sup>170</sup>, weak recommendation, low quality evidence).
- + No-sun tanning products only offer partial protection against sunburn (EB<sup>171</sup>, weak recommendation, moderate quality evidence).
- + Do not lie (on your own) in the sun. Move (cycle, walk ...) because then the angle of the sun is constantly changing and the risk of burning is reduced.
- + Avoid using a sunbed. This will increase your risk of skin cancer (melanoma).

### Summaries made for topics for which no evidence could be identified:

- ILCOR FA 771: Wet compared with dry burn dressing.
- ES Burns – Plastic foil: p112 in summary book
- ES Burns in respiratory tract – Drinking ice water: p129 in summary book
- ES Snow blindness/arc-eye – Wet dressing: p131 in summary book
- ES Pepper spray – Cleansing skin with a greasy product: p137 in summary book
- ES Chemical burns – Irrigation with water: p139 in summary book
- ES Sunburn – Sunbed: p161 in summary book

### Summaries for which studies have been identified but which have not resulted in a recommendation:

- ES Sunburn – Aloe Vera: p151 in summary book
- ES Sunburn – Polypodium leucotomos: p156 in summary book

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<sup>170</sup> ES Sunburn – Sunscreen + insect repellent: p149 in summary book: There is limited evidence in favour of sunscreen alone compared to sunscreen + insect repellent.

<sup>171</sup> ES Sunburn – Sunless tanning: p154 in summary book: There is limited evidence in favour of sunless tanning. Expertopinie: effect is beperkt en het gebruik van zonnecrème moet primair aanbevolen worden.

# Head and neck

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# 1. Fainting

## What do you see?

- + The person looks pale. Dark-coloured people take on a dull grey appearance.
- + He feels dizzy and sees black spots or stars before his eyes.
- + He may hear noise in his ears (tinnitus).
- + He feels weak and sometimes nauseous too.
- + He may indicate that he is warm and may start sweating. His skin feels cold and clammy.
- + The injured person sometimes has to yawn.
- + Sometimes the injured person feels a tingling in his fingers.
- + He has reduced consciousness, finally loses consciousness and falls over.

## This is what you should do!

1. Make the area safe
  - + If you see the fainting fit coming, support the injured person when he falls. Try to prevent the injured person injuring himself while falling.
  - + Help the injured person to lie flat on the ground.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the fainting fit occurred without a noticeable cause such as emotion or severe pain;
    - o the fainting occurs repeatedly;
    - o there may be a heart problem (for example, when an injured person faints while lying down, while doing exercise or in the case of someone with increased risk, see Heart Disorders);
    - o the fainting occurred as a result of a blow to the head (for example, in a fall or a blow or punch to the head).
  - + Call the emergency services on 112 if the injured person does not regain consciousness after two minutes.
4. Administer further first aid
  - + Ensure that there is fresh air and ask bystanders to stand back.
  - + Loosen any clothing that may obstruct breathing.
  - + Place cold compresses or a damp facecloth on the person's forehead.
  - + When the person regains consciousness, let him lie down for a little longer. If he feels alright, help him to sit up gradually. First help him into a half-sitting position and then a sitting position. Do this over the course of several minutes. If he feels alright after a while, let him stand up carefully. If he starts to feel faint again, help him to lie down again until he is fully recovered.
  - + Check to see whether the person has sustained any injuries when falling. Act according to your findings.
  - + If the person does not regain consciousness after two minutes, put him in the recovery position. Treat as you would an unconscious injured person. Check the injured person's

consciousness and breathing every minute (EB<sup>172</sup>, weak recommendation, very low quality evidence).

### Preventing a fainting fit

If you feel a fainting fit coming on, go and lie down if you can. If you cannot lie down (for example, if you are sitting in a car) cross your lower legs and press them firmly together, while tensing your leg muscles. This will help increase your blood pressure slightly, which may prevent you from fainting. Standing on your toes, moving your arms, squatting and then standing up straight again, or bending over (for example, as if you are tying your shoelaces) are all techniques that can have the same effect (EB<sup>173,174</sup>, weak recommendation, low to very low quality evidence).

## 2. Head injury

### 2.1 Head wound

#### What do you see?

- + The injured person has a bleeding head wound. The wound may be bleeding profusely.
- + The injured person may have a bump.
- + Sometimes, there may be a loose flap of skin from the scalp, exposing the underlying skull.
- + The injured person may have a headache (EB<sup>175</sup>, moderate quality evidence).
- + The injured person may feel drowsy or confused (EB<sup>175</sup>, moderate quality evidence).
- + There may be signs of a skull fracture (see Skull fracture), a brain injury (see Brain injury) or a spinal injury (see Spinal injury).

#### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposable gloves (EB<sup>176</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the breathing if necessary.

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<sup>172</sup> ILCOR FA 517: Recovery position: We suggest that first aid providers position individuals who are unresponsive and breathing normally into a lateral, sidelying recovery (lateral recumbent) position as opposed to leaving them supine.

<sup>173</sup> ES Syncope – physical manoeuvres, p170 in summary book: There is limited evidence in favour of leg crossing with or without muscle tension, arm exercise and muscle tension.

<sup>174</sup> ES Syncope – posture: p168 in summary book: There is limited evidence in favour of squatting.

<sup>175</sup> ES Head injury – Clinical signs/symptoms: p177 in summary book: Infants: there is limited evidence showing that any loss of consciousness is a predictive symptom for the presence of a minor intracranial head injury. Children: there is limited evidence showing that any seizure, visual symptoms, any loss of consciousness, severe or persistent headache, persistent vomiting, anterograde or post-trauma amnesia are predictive for the presence of an intracranial head injury. Adults: there is limited evidence showing that any seizure, undefined, persistent vomiting or retrograde amnesia are predictive symptoms for the presence of a minor intracranial head injury.

<sup>176</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

- + Check the severity of the head wound. A head wound is for instance severe if the wound was caused by a heavy blow to the head, if there is an object in the wound, if the bleeding cannot be staunched, if the face is injured or if the wound is more than skin deep. In these cases, the injured person runs the risk of a brain injury (see Brain injury).
3. Seek help from a specialist
- + Seek help from a specialist if:
    - o the head wound is severe (if you suspect, for instance, that the head wound will need stitching);
    - o the injured person feels unwell after the accident or if his condition deteriorates (for example, in the case of worsening headache or nausea and increasing drowsiness);
    - o you are in doubt.
  - + Call the emergency services on 112 if:
    - o the injured person is unconscious, has reduced consciousness or has been unconscious;
    - o the injured person has suffered a serious blow to the head;
    - o you suspect a fractured skull (see Skull fracture), brain injury (see Brain injury), or spinal injury (see Spinal injury).
4. Administer further first aid
- + If the injured person has a minor head wound, treat it like any other skin wound (see How to treat a skin wound?) (EB<sup>177</sup>, strong recommendation, moderate quality evidence).
  - + A serious head wound should not be rinsed with water or a disinfectant. There may after all be an open skull fracture under the wound. Do not touch any loose skin flaps on the head and apply a light pressure bandage using compresses and a bandage wrap (EB<sup>178</sup>, weak recommendation, very low quality evidence).
  - + If the injured person has a bump, cool this for a maximum of 20 minutes with ice cubes in a bag of water or a cool bag, to reduce the swelling and pain (EB<sup>179</sup>, weak recommendation, low quality evidence; EB<sup>180</sup>, weak recommendation, very low quality evidence). While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Use a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. Do not place ice on a bleeding wound.
  - + Stop the cooling process if the injured person is bothered by it. If the pain recurs, you can cool the wound again, as long as the skin is back to a normal temperature.
  - + Continue to observe the injured person. Check to see whether his condition is deteriorating.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>181</sup>, strong recommendation, low quality evidence).

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<sup>177</sup> ES Skin wounds – Irrigation with water: p89 in summary book: There is limited evidence, neither in favour of using tap water nor saline solution.

<sup>178</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence, neither in favour of manual compression nor vascular closing devices.

<sup>179</sup> ES Bruise – ice: p 73 in summary book: There is limited evidence, neither in favour of using a cold compress nor no treatment.

<sup>180</sup> ILCOR FA 530: Control of bleeding: Localized cold therapy with or without pressure may be beneficial in hemostasis for closed bleeding in extremities.

<sup>181</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

## 2.2 Skull fracture

### What do you see?

- + The injured person is losing blood or clear fluid via the nose, mouth and/or an ear.
- + After a while, there might be some blue discoloration around the eyes. This is called periorbital ecchymosis (raccoon eyes). There may also be blue discoloration behind the ears.
- + The injured person may have a headache.
- + He may feel drowsy or confused.
- + If the injured person has suffered a basilar fracture, there will be symptoms of impaired nerve functioning: partial failure of sight, smell, hearing and balance. You can only evaluate this if the injured person is conscious.
- + There may be signs of brain injury (see Brain injury) or a spinal injury (see Spinal injury).

### This is what you should do!

1. Make the area safe
  - + Put on disposable gloves (EB<sup>182</sup>, strong recommendation, moderate quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services on 112.
4. Administer further first aid
  - + Be alert for signs of skull fracture (see Head injury). If in doubt, assume the worst.
  - + Is the injured person conscious and breathing normally?

Yes: conscious and breathing normally.	No: unconscious but breathing normally.
<ul style="list-style-type: none"> <li>+ Reassure the injured person and persuade him not to move.</li> <li>+ Immobilise the head and neck of the injured person. Only do this if the injured person is cooperative (not if he is anxious or agitated) (EB<sup>183</sup>, weak recommendation).</li> <li>+ Continue to observe the injured person until specialized help arrives.</li> <li>+ Check to see whether his condition is deteriorating.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>182</sup>, strong recommendation, low quality evidence).</li> </ul>	<ul style="list-style-type: none"> <li>+ Let the injured person lie on his back, tilt the head back and lift the chin up if he is breathing normally.</li> <li>+ Check the injured person's consciousness and breathing every minute.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>182</sup>, strong recommendation, low quality evidence).</li> </ul>

<sup>182</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>183</sup> ES Spine injury – Manual stabilisation using hands or knees: p185 in summary book: No evidence was found. ILCOR FA 772: spinal motion restriction: We suggest against the use of cervical collars by first aid providers.

If the injured person is unconscious and is no longer breathing normally, start resuscitation (see Resuscitation).

## 2.3 Brain injury or concussion

### What do you see?

- + The injured person may have a headache.
- + He may feel drowsy or confused.
- + He has signs of seriously impaired consciousness such as drowsiness, agitation, dizziness, memory loss, reduced consciousness or unconsciousness. The injured person may not remember exactly what happened.
- + He may feel bothered by light and/or noise (light and/or sound sensitivity).
- + He may be losing blood from the nose and/or ear.
- + He makes jerky movements or has cramped, twisted arms or legs.
- + His breathing is slow.
- + The injured person may feel nauseous and vomit.
- + External injuries might be visible (see Head wound).
- + There may be a difference in pupil size (anisocoria) (EB<sup>184</sup>, very low quality evidence). This occurs because the nerve channels are pinched or there is increased pressure in the brain.
- + There may be signs of a skull fracture (see Skull fracture) or a spinal injury (see Spinal injury).

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposable gloves if the injured person is losing blood or other fluids (EB<sup>185</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the injured person feels unwell after the accident or if his condition deteriorates (for example, in the case of worsening headache or nausea and increasing drowsiness);
    - o you are in doubt.
  - + Call the emergency services on 112 if:
    - o the injured person is unconscious, has reduced consciousness or has been unconscious;
    - o the injured person has suffered a serious blow to the head;
    - o you suspect a fractured skull (see Skull fracture), facial fracture (see Facial fracture) or spinal injury (see Spinal injury)
4. Administer further first aid
  - + Watch out for danger signs of brain injury. If in doubt, assume the worst.
  - + Is the injured person conscious and breathing normally?

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<sup>184</sup> ES Neurologic stability – Pupils check: p1006 in summary book: There is limited evidence with harm for anisocoria, miosis, mydriasis.

<sup>185</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

Yes: conscious and breathing normally.	No: unconscious but breathing normally.
<ul style="list-style-type: none"> <li>+ Let the injured person rest.</li> <li>+ Reassure the injured person and persuade him not to move.</li> <li>+ Immobilise the head and neck of the injured person if you suspect a spinal injury. Only do this if the injured person is cooperative (not if he is anxious or agitated).</li> <li>+ Let another first aider treat any head wounds.</li> <li>+ Continue to observe the injured person. Check to see whether his condition is deteriorating.</li> <li>+ Do not leave the injured person alone for the first 24 hours after the accident. His condition may deteriorate.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>186</sup>, strong recommendation, low quality evidence).</li> </ul>	<ul style="list-style-type: none"> <li>+ Let the injured person lie on his back, tilt the head backwards and lift the chin up if he is breathing normally.</li> <li>+ Check the injured person's consciousness and breathing every minute.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>186</sup>, strong recommendation, low quality evidence).</li> </ul>

### Preventing a head injury

- + Wear a helmet if there is a risk of head injury, for example when riding a bike, moped or motorbike, if you are working on a construction site, or if you are practising certain sports (EB<sup>187</sup>, strong recommendation, moderate quality evidence). Wearing a helmet on a moped or motorbike is a legal requirement.
- + If the person injured in an accident is wearing a helmet, as a first aider, you should leave it on, and call the emergency services on 112. Open the helmet visor.
- + Head injuries are regularly caused by a fall. Take a good look around your own home: look for fall risks and try and eliminate them by, for example, removing loose mats, not wearing open slippers, making sure there is sufficient light... (EB<sup>188</sup>, strong recommendation, moderate quality evidence).
- + Always wear a seat belt in the car. This will prevent your head from bashing against the front windscreen if you have to brake suddenly. Wearing a seat belt in the car is a legal requirement.

## 3. Facial fracture

### What do you see?

- + The injured person has a painful and very swollen face.
- + He has a black eye and/or bruises on the face.
- + He finds it difficult to speak, chew or swallow.
- + The injured person may have vision impairment (double or blurred sight).

<sup>186</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>187</sup> ES Head injury – Bicycle helmet: p182 in summary book: There is evidence in favour of wearing a bicycle helmet.

<sup>188</sup> ES Fall injuries – Home safety assessment: p 184 in summary book: There is evidence in favour of home safety assessment.

## Head and neck

- + His nose may be crooked and blood may be coming out of his mouth, nose or ears.
- + There may be signs of a skull fracture or brain injury (see Brain injury).

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposable gloves if the injured person is losing blood or other bodily fluids (EB<sup>189</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Immediately seek help from a specialist if you suspect a facial fracture.
  - + Call the emergency services on 112 if you see any danger signs that might indicate a skull fracture or brain injury (see Brain injury).
4. Administer further first aid
  - + Cool the painful site for a maximum of 20 minutes with ice cubes in a bag of water or a cool bag to reduce the swelling and pain. While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Use a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily (EB<sup>190</sup>, weak recommendation, low quality evidence; EB<sup>191</sup>, weak recommendation, very low quality evidence).
  - + Stop cooling if the injured person is bothered by it. If the pain recurs, you can cool the wound again, as long as the skin is back to a normal temperature.
  - + If the nose is bleeding, ask the injured person to carefully pinch the nostrils (see Blood from the nose) (EB<sup>192</sup>, weak recommendation, very low quality evidence).
  - + Never try and re-set a crooked nose yourself.
  - + If the injured person cannot close his lower jaw, never try and put it back in place.
  - + If you suspect that the lower jaw is broken, ask the injured person to sit and lean forward. If possible, have him support the lower jaw himself. Do not bandage it, because this will cause an obstruction if the injured person vomits or has breathing difficulties.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>189</sup>, strong recommendation, low quality evidence)

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<sup>189</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>190</sup> ES Bruise – ice: p 73 in summary book: There is limited evidence, neither in favour of using a cold compress nor no treatment.

<sup>191</sup> ILCOR FA 530: Control of bleeding: Localized cold therapy with or without pressure may be beneficial in hemostasis for closed bleeding in extremities.

<sup>192</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence, neither in favour of manual compression nor vascular closing devices.

## 4. Spinal injury

### What do you see?

- + The injured person may experience sensory impairment and symptoms of paralysis. Sometimes he has a reduced feeling or a tingling sensation in the limbs.
- + He may be experiencing pain in the neck, the nape of the neck, the back or the back of the pelvis, both spontaneously and when moving. This pain may or may not be accompanied by a head injury (see Head injury).
- + He has a persistent and serious headache and may act strangely (he may for instance be irritable).
- + He may show signs of impaired consciousness: drowsiness, sleepiness, anxiety, memory loss, unconsciousness.
- + The injured person may not remember exactly what happened.
- + The injured person may feel nauseous and vomit.
- + The injured person may have sustained serious injuries to the head.

Even if the injured person has no symptoms, there may still be a spinal injury.

### This is what you should do!

1. Make the area safe
  - + Do not move the injured person if you suspect a spinal injury.
  - + Wash your hands and put on disposable gloves if the injured person is losing blood or other bodily fluids (EB<sup>193</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the breathing.
3. Seek help from a specialist
  - + Call the emergency services on 112. The specialist care providers can use various auxiliaries to immobilise the head and spinal column.
4. Administer further first aid
  - + Look out for danger signs of a spinal injury. If in doubt, assume the worst.
  - + Is the injured person conscious and breathing normally?

<b>Yes: conscious and breathing normally.</b>	<b>No: unconscious but breathing normally.</b>
<ul style="list-style-type: none"> <li>+ Reassure the injured person and persuade him not to move.</li> <li>+ Immobilise the head and neck of the injured person. Only do this if the injured person is cooperative (not if he is anxious or agitated). Take off your gloves and wash your hands after administering first aid (EB<sup>193</sup>, strong recommendation, low quality evidence).</li> </ul>	<ul style="list-style-type: none"> <li>+ Let the injured person lie on his back, tilt the head back and lift the chin up if he is breathing normally (EB<sup>194</sup>, weak recommendation, very low quality evidence).</li> <li>+ Check the injured person's consciousness and breathing every minute.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>193</sup>,</li> </ul>

<sup>193</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>194</sup> ES Spine injury – Chin lift vs jaw thrust: see appendix 2: There is limited evidence in favour of the jaw thrust to improve airway patency in the trauma patient with suspected cervical spine injury.

	strong recommendation, low quality evidence).
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## 5. Whiplash

### What do you see?

The symptoms of whiplash often do not occur until hours after the accident. You should suspect whiplash if the injured person suffers from the following symptoms some time after the accident:

- + The injured person has pain in the neck that may radiate to the head, shoulders, arms and hands.
- + The injured person may feel stiff, and experience tingling in the arms and hands.
- + He may have a headache, be dizzy and have trouble concentrating. He may also be tired, nauseous and suffer from impaired sight or tinnitus. These various symptoms can become chronic.

### This is what you should do!

Given that the symptoms of whiplash often do not occur until some time after the accident, there are not many actions you can undertake as a first aider.

You should treat the person involved in an accident as described in previous sections (see Head injury and Spinal injury).

### Preventing whiplash

- + Always wear a seat belt in the car.
- + Obey the road rules and regulations.
- + Make sure you have good support for your back in the car, and ensure that your headrest is in the correct position: (EB<sup>195</sup>, strong recommendation, very low quality evidence)
  - o Sit in the car seat, in your normal driving position (not leaning forward).
  - o Make sure that your seat is upright.
  - o Now adjust your headrest so that it is as close as possible to the back of your head, preferably touching it.
  - o Ensure that the top of the headrest is not lower than the top of your head.

## 6. Hanging and strangulation

### What do you see?

- + The injured person has hanged himself or has been strangled (by something or someone).
- + The neck may be entwined or there may be signs of the entwinement such as grazes or bruises.
- + The injured person may have difficulty breathing or may have stopped breathing.

### This is what you should do!

1. Make the area safe

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<sup>195</sup> ES Whiplash – Correct placement of headrest: p187 in summary book: There is limited evidence in favour of an adequately positioned head restraint.

- + Call for help.
  - + Support the hanging person to reduce pressure on the throat.
  - + Untie the noose as quickly as possible above the knot. Do not let the injured person fall while doing this.
2. Assess the condition of the injured person
    - + Find out what is wrong with the injured person.
    - + Check whether the injured person is conscious.
    - + Open the airway and check the breathing.
  3. Seek help from a specialist
    - + Call the emergency services on 112.
  4. Administer further first aid
    - + Place the person in the recovery position if he is unconscious but breathing normally (EB<sup>196</sup>, weak recommendation, very low quality evidence). Check the person's consciousness and breathing every minute.
    - + If the person is unconscious and no longer breathing normally, begin resuscitation (see Resuscitation).
    - + Wash your hands after administering first aid (EB<sup>197</sup>, strong recommendation, low quality evidence).

## 7. Stroke

### What do you see?

The symptoms of a stroke appear suddenly and depend on the location and size of the part of the brain that is affected. Therefore, the following symptoms are not all necessarily present:

- + The person shows signs of impaired consciousness: unconsciousness, sleepiness, confusion, absent-mindedness, agitation, restlessness. He may, for instance, speak more slowly or incoherently.
- + He may feel dizzy and walk unsteadily. It looks as though he is drunk. The vomiting can also reinforce the suspicion of drunkenness.
- + The person may find it difficult to move an arm, hand or leg, or may not be able to move them at all. He feels weak. There may be sensory impairment, muscle weakness or paralysis in one limb, or on one side of the face or body. This symptom is characteristic of a stroke. The person has no feeling or a strange feeling on one side of his body.
- + The person may have a headache.
- + Some people with a stroke suffer from impaired vision (for example, sight in one eye only) or hearing.
- + The person often has a drooping mouth. This is accompanied by impaired speech (speech disorders) or difficulty swallowing.

### This is what you should do!

1. Make the area safe
  - + If you have to move the person (for example, because of a dangerous situation), support him on the paralysed side.

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<sup>196</sup> ILCOR FA 517: Recovery position: We suggest that first aid providers position individuals who are unresponsive and breathing normally into a lateral, sidelying recovery (lateral recumbent) position as opposed to leaving them supine.

<sup>197</sup> Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

2. Assess the condition of the person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the person's breathing.
3. Seek help from a specialist
  - + Call the emergency services immediately on 112.
4. Administer further first aid
  - + Let the person rest, with no further exertions. Ensure that he remains as calm as possible.
  - + Help the person to rest in a comfortable position (for example, sitting or half-sitting) (EB<sup>198</sup>, weak recommendation, low quality evidence).
  - + If the person is sitting at a slant, support him so that he does not fall.
  - + Do the FAST test. This may confirm your suspicion of a stroke. (EB<sup>199</sup>, strong recommendation, low quality evidence)
  - + Do not give the person anything to eat or drink. He may choke on it.
  - + Continue to speak calmly to the ill person. Be aware that he may have difficulty speaking or may not be able to speak and is anxious. Give him enough time to answer.
  - + If the person is or becomes unconscious, put him in the recovery position. Treat as you would any unconscious person.
  - + Check the person's consciousness and breathing every minute.
  - + Wash your hands after administering first aid (EB<sup>200</sup>, strong recommendation, low quality evidence).

## 8. Seizures and fits

### 8.1 Seizures and fits of unknown cause

#### What do you see?

- + The ill person starts convulsing. This can last several minutes.
- + The cause of the seizure is unknown.

#### This is what you should do!

1. Make the area safe
  - + Remove any objects that may harm the person or move him to a safe environment.
  - + Put on disposable gloves (EB<sup>201</sup>, strong recommendation, moderate quality evidence).
  - + While the person is convulsing, place a flat cushion (or a folded jumper or some other soft item that is not too thick) under the person's head. This will prevent any injuries to the head. Try to place the cushion so that you do not bend the head forwards.
  - + Do not stick anything in the person's mouth and do not put anything between his teeth.

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<sup>198</sup> ES Stroke – Body position: p190 in summary book: There is limited evidence neither in favour of sitting up in bed/supine position nor sitting up in a chair. There is limited evidence in favour of sitting in a chair compared to sitting propped in bed/lying on the (non-)paretic side. There is limited evidence neither in favour of sitting propped in bed, lying on the (non-)paretic side nor the supine position. There is limited evidence in favour of the supine position (with head at 0°) compared to supine position with head at 15°/30°.

<sup>199</sup> ILCOR FA 801: stroke recognition: We recommend that first aid providers use stroke assessment systems (such as FAST or CPSS) for individuals with suspected acute stroke.

<sup>200</sup> Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>201</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is evidence in favour of using gloves.

- + Do not try to hold the person or stop his movements.
2. Assess the condition of the person
    - + Find out what is wrong with the person.
    - + Do the following when the seizure has finished:
      - o Remove the cushion or other object from under the head.
      - o Check whether the person is conscious.
      - o Open the airway and check the person's breathing.
  3. Seek help from a specialist
    - + Call the emergency services on 112. After all, you do not know what the cause of the seizure is (see Epilepsy and Febrile seizures if you do know the cause).
    - + Even if the attack was short-lived and the person feels alright afterwards, advise him to seek help from a specialist if he does not know the cause of the seizures.
  4. Administer further first aid
    - + Make a note of the details of the seizure (duration and response of the person).
    - + Place the person in the recovery position as soon as the convulsing phase has finished. This will allow any fluids (secretions) to flow out of the person's mouth. This should definitely be done if the person does not regain consciousness after the convulsing phase or after a few minutes. Treat him then as you would any unconscious person. Check the person's consciousness and breathing every minute (EB<sup>202</sup>, weak recommendation).
    - + Make sure that the person can be moved to a peaceful environment. Ensure that he is comfortable (opportunity to freshen up, change clothes ...).
    - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>203</sup>, strong recommendation, low quality evidence).

## 8.2 Epilepsy

### What do you see?

- + In the case of a minor attack, the person seems absent for a little while (but he does not fall).
- + Prior to a major attack, the person may experience abnormal sensations (see flashing lights, hear rushing noises in the ears, or have a strange taste in the mouth).
- + The person tenses his muscles.
- + The person makes convulsing movements with a part of the body or the whole body.
- + He may bite his own tongue and suffer urinary or fecal incontinence.
- + The person's nails and lips may turn blue.
- + Sometimes the eyes roll backwards.
- + The convulsions can last several minutes. Thereafter, the muscles relax again and consciousness gradually returns. The person is usually confused and very tired. In many cases, the person cannot remember a thing.

### This is what you should do!

First aid is only necessary in the event of a major seizure.

1. Make the area safe
  - + Remove any objects that may harm the person or move him to a safe environment.
  - + Put on disposable gloves (EB<sup>204</sup>, strong recommendation, moderate quality evidence).

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<sup>202</sup> ILCOR FA 517: Recovery position: We suggest that first aid providers position individuals who are unresponsive and breathing normally into a lateral, sidelying recovery (lateral recumbent) position as opposed to leaving them supine.

<sup>203</sup> Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>204</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book. There is evidence in favour of using gloves.

## Head and neck

- + While the person is convulsing, place a flat cushion (or a folded jumper or some other soft item that is not too thick) under the person's head. This will prevent any injuries to the head. Try to place the cushion so that you do not bend the head forwards.
  - + Do not stick anything in the person's mouth and do not put anything between his teeth.
  - + Do not try to hold the person or stop his movements.
2. Assess the condition of the person
    - + Find out what is wrong with the person.
    - + Do the following when the seizure has finished:
      - o Remove the cushion or other object from under the head.
      - o Check whether the person is conscious.
      - o Open the airway and check the person's breathing.
  3. Seek help from a specialist
    - + If the person is known to have epilepsy, it is not always necessary to seek help from a specialist when he has an epileptic fit. Do call the emergency services on 112 if:
      - o nobody in the immediate vicinity knows the person;
      - o nobody in the immediate vicinity knows that the person has epilepsy;
      - o the person remains unconscious for more than a few minutes after the seizure;
      - o the seizure lasts longer than 5 minutes;
      - o one major seizure is constantly followed by another;
      - o this is the person's first epileptic seizure;
      - o the seizure is different from what bystanders, who know the person, are used to (for example, a major seizure when the person usually suffers minor seizures) or occurs more frequently;
      - o the person is under the influence of alcohol or drugs;
      - o the seizure is accompanied by high fever;
      - o the person is pregnant;
      - o the person has diabetes;
      - o the person has sustained serious injuries during the seizure.
  4. Administer further first aid
    - + Make a note of the details of the seizure (duration, and response of the person) and try to find out if the person has a history of epilepsy.
    - + Place the person in the recovery position as soon as the convulsing phase has finished (EB<sup>205</sup>, weak recommendation, very low quality evidence). This will allow any fluids (secretions) to flow out of the person's mouth. This should definitely be done if the person does not regain consciousness after the convulsing phase or after a few minutes. Treat him then as you would any unconscious person. Check the person's consciousness and breathing every minute.
    - + Make sure that the person can be moved to a peaceful environment. Ensure that he is comfortable (opportunity to freshen up, change clothes ...).
    - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>206</sup>, strong recommendation, low quality evidence).

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<sup>205</sup> ILCOR FA 517: Recovery position: We suggest that first aid providers position individuals who are unresponsive and breathing normally into a lateral, sidelying recovery (lateral recumbent) position as opposed to leaving them supine.

<sup>206</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

## 8.3 Febrile seizures

### What do you see?

- + The child has a fever.
- + He is convulsing.
- + Sometimes, he loses consciousness.
- + The child may be breathing intermittently (breathing seems to be impaired).
- + The child's nails and lips may turn blue.
- + Sometimes the eyes roll backwards.

### This is what you should do!

First aid for this case is similar to that given to a person suffering from seizures and fits with an unknown cause.

1. Make the area safe
  - + Remove any objects that may harm the person or move him to a safe environment.
  - + Put on disposable gloves (EB<sup>207</sup>, strong recommendation, moderate quality evidence).
  - + While the person is convulsing, place a flat cushion (or a folded jumper or some other soft item that is not too thick) under the person's head. This will prevent any injuries to the head. Try to place the cushion so that you do not bend the head forwards.
  - + Do not stick anything in the person's mouth and do not put anything between his teeth.
  - + Do not try to hold the person or stop his movements.
2. Assess the condition of the person
  - + Find out what is wrong with the person.
  - + Do the following when the seizure has finished:
    - o Remove the cushion or other object from under the head.
    - o Check whether the person is conscious.
    - o Open the airway and check the person's breathing.
3. Seek help from a specialist
  - + Seek help from a specialist. Even if the seizure was short-lived, and the child feels alright afterwards, you should seek specialized help in the event of febrile seizures.
  - + Call the emergency services on 112 if:
    - o the seizure lasts longer than 2 minutes;
    - o the person has several attacks during the same febrile period;
    - o this is the first attack that the child between 3 months and 5 years has suffered, and the seizure is still ongoing when you find him;
    - o the person is vomiting;
    - o the person is sensitive to light in combination with one of the above danger signs;
    - o the person has small, red or purple, pinpoint bleeds on the skin (petechiae, caused by a very small superficial bleed under the skin).
4. Administer further first aid
  - + Put the person in the recovery position as soon as the convulsing phase has finished (EB<sup>208</sup>, weak recommendation, very low quality evidence). This will allow any fluids (secretions) to flow out of the person's mouth. This should definitely be done if the person does not regain

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<sup>207</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book. There is evidence in favour of using gloves.

<sup>208</sup> ILCOR FA 517: Recovery position: We suggest that first aid providers position individuals who are unresponsive and breathing normally into a lateral, sidelying recovery (lateral recumbent) position as opposed to leaving them supine.

consciousness after the convulsing phase or after a few minutes. Treat him then as you would any unconscious person. Check the person's consciousness and breathing every minute.

- + Take the person's temperature.
- + The parents can give their child medication to suppress the fever, suitable for his age and body weight (EB<sup>209</sup>, weak recommendation, moderate quality evidence).
- + Try to bring down the fever after the seizure has finished. Cool down the person by removing his clothing and gently dabbing him with luke-warm water. Explain what you are going to do and why. Desist with the dabbing if this upsets the child. Do not use cold water (EB<sup>210,211</sup>, weak recommendation, low quality evidence).
- + Do not give the child anything to eat or drink.
- + Make sure that the person can be moved to a peaceful environment. Ensure that the child is comfortable (opportunity to freshen up, change clothes ...).
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>212</sup>, strong recommendation, low quality evidence).

## 9. Injuries to the eye

### 9.1 Eye injury

#### What do you see?

- + The injured person has painful swollen eyelids. In many cases he can no longer keep the eye open.
- + The eye is painful and watering.
- + There may be blood or clear liquid coming from the eye.
- + The injured person may have difficulty seeing (for example, blurred vision).

#### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>212</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if the person has an eye injury.
4. Administer further first aid
  - + Have the injured person sit in a place where there is enough light to examine the eye. Do not touch the eye while doing this.
  - + Let the injured person sit comfortably and keep the head still.

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<sup>209</sup> ES fever – paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

<sup>210</sup> ES Fever – Physical methods: p843 in summary book: There is limited evidence neither in favour of sponging nor placebo. There is limited evidence neither in favour of tepid water sponging nor paracetamol. There is limited evidence in favour of paracetamol (compared to cold water sponging).

<sup>211</sup> ES Fever – physical methods + paracetamol: p848 in summary book: There is limited evidence in favour of sponging with tepid water combined with paracetamol for the resolution of fever. There is limited evidence in favour of paracetamol only for the outcome adverse events/discomfort.

<sup>212</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

- + Ask the injured person not to rub his eyes.
- + Advise the injured person to move his eyes as little as possible. Both eyes move simultaneously, so it is better to keep them both shut.
- + Let the injured person hold compresses or a clean dry cloth over both eyes if possible. When doing so, try not to apply any pressure to the eyeball. Pressure may cause loss of the fluid content of the eye and result in blindness. You can, if necessary, hold the compresses or cloth in place with a plaster or with a non-compressing bandage.
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>213</sup>, strong recommendation, low quality evidence).

### Preventing an eye injury

- + Wear safety glasses when carrying out work that entails a risk of eye injury (metal work, working with a hammer and chisel...). Consider wearing safety glasses when doing-it-yourself at home as well (EB<sup>214</sup>, weak recommendation, very low quality evidence).
- + If your job entails the risk of eye injuries, adhere strictly to the recommended safety regulations (metal worker, mechanic, carpenter, sandblaster,...).
- + Avoid working with sharp objects. Be careful if you do have to.
- + Do not use fireworks. If you do, follow the instructions carefully.
- + Do not let children play with dangerous toys (gun, bow and arrow, sharp objects) (EB<sup>215</sup>, weak recommendation, very low quality evidence).
- + Do not give children pointed or sharp objects (scissors, ball pen). Teach children to handle sharp objects carefully (EB<sup>215</sup>, weak recommendation, very low quality evidence).

## 9.2 Foreign object in the eye

### What do you see?

- + There is a foreign object in the injured person's eye. Sometimes you can see the foreign object, but sometimes it is invisible.
- + The eye may be painful.
- + The eye waters and may look red.
- + There may be blood or clear liquid coming from the eye.
- + The injured person has vision problems.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>213</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Call the emergency services on 112 if there is a foreign object in the injured person's eye.

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<sup>213</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>214</sup> ES Eye injury – Eye protection: p201 in summary book: There is limited evidence in favour of wearing safety glasses.

<sup>215</sup> ES Eye injury – sharp objects: p203 in summary book: There is limited evidence with harm for exposure to sharp pointed objects.

- + If it is just a speck in the eye, there is no need to call emergency services (see Speck in the eye).
4. Administer further first aid
- + Have the injured person sit in a place where there is enough light to examine the eye. Do not touch the eye while doing this.
  - + Let the injured person sit comfortably and also keep the head still.
  - + Ask the injured person not to rub his eyes.
  - + Advise the injured person to move his eyes as little as possible. Both eyes move simultaneously, so it is better to keep them both shut.
  - + Let the injured person hold compresses or a clean dry cloth over both eyes if possible. When doing so, do not apply any pressure to the eyeball or the foreign object. This may cause loss of the fluid content of the eye and result in blindness. You can, if necessary, hold the compresses or cloth in place with a plaster or a non-compressive bandage.
  - + Do not remove the foreign object yourself, unless it is just a speck (see Speck in the eye).
  - + If the object is sticking out of the eye, you can protect the eye from further injury (for example, deeper penetration into the eye) by placing a (preferably transparent) plastic beaker over it.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>216</sup>, strong recommendation, low quality evidence).

## 9.3 Speck in the eye

### What do you see?

- + The injured person experiences an abrasive feeling when blinking or moving the eyes.
- + He has a red, watering eye, that he often keeps shut in a cramped way.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>217</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if you cannot remove the speck.
4. Administer further first aid
  - + Have the injured person sit in a place where there is enough light to examine the eye.
  - + Ask the injured person not to rub his eyes.
  - + Let him remove his glasses or take out his contact lenses where necessary.
  - + Try and rinse away the dirt particle (EB<sup>218</sup>, strong recommendation, high quality evidence). Rinse with plenty of water (EB<sup>219</sup>, weak recommendation, very low quality evidence).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>222</sup>, strong recommendation, low quality evidence).

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<sup>216</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>217</sup> ES Hygienic measures – washing. There is evidence in favour of using gloves.

<sup>218</sup> ES Eye injury – temperature rinsing fluid: p199 in summary book: There is evidence in favour of warm saline solution.

<sup>219</sup> ILCOR FA 540: Chemical injury – Eye irrigation: We suggest that first aid providers use continuous, large volumes of clean water for irrigation of chemical eye injuries.

## 9.4 Black Eye

### What do you see?

- + The injured person has been hit in the eye.
- + The area around the eye is swollen and bluish-red in colour.
- + The injured person may have vision problems.
- + The injured person can in some cases not keep the eye open. The eye itself may also be damaged.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>220</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist in the event of vision problems.
  - + Call the emergency services on 112 if there are signs of a more serious injury (for example, in the case of periorbital ecchymosis (raccoon eyes), loss of consciousness...).
4. Administer further first aid
  - + Cool the area around the injured eye to reduce swelling and pain (EB<sup>221</sup>, weak recommendation, low quality evidence; EB<sup>222</sup>, very low quality evidence). Do this with ice cubes in a bag of water or a cool bag, without putting any pressure on the eye itself. While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Use a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. If no ice is available, wet a clean cloth in cold water.
  - + Try to open the eyelids a little, to see if the injured person can still see normally from the eye.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>220</sup>, strong recommendation, low quality evidence).

## 10. Injuries to the ear

### 10.1 Foreign object in the ear

#### What do you see?

- + The injured person has pain or tickling in the ear.
- + The injured person may have hearing problems.
- + This is probably a case of a perforated eardrum if:

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<sup>220</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>221</sup> ES Bruise – ice: p 73 in summary book: There is limited evidence, either in favour of using a cold compress or no treatment.

<sup>222</sup> ILCOR FA 530: Control of bleeding: Localized cold therapy with or without pressure may be beneficial in hemostasis for closed bleeding in extremities.

- the injured person complains that there is a constant rushing noise and impaired hearing;
- he has earache;
- there is blood coming from the ear;
- the injured person feels dizzy and has balance problems.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if the injured person has a foreign object in the ear.
4. Administer further first aid
  - + Have the injured person sit in a place where there is enough light to examine the ear.
  - + Let the injured person sit comfortably and also keep the head still.
  - + Ask the injured person not to rub the inside of the ear with a finger or cotton bud.
  - + Cover the ear with a dry compress if you suspect a perforated eardrum. Make sure that no water gets inside the ear canal.
  - + Never remove a foreign object from the ear yourself. It is very likely that you will push the object further into the ear, thereby aggravating the injury.
  - + Wash your hands after administering first aid (EB<sup>223</sup>, strong recommendation, low quality evidence).

## 10.2 Earache

### What do you see?

- + The person is experiencing pain in one or both ears.
- + He may experience tinnitus or impaired hearing.
- + The person may suffer from balance problems.
- + In some cases there will be pus coming from the ear canal.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - the pain persists;
    - the person has a fever;
    - there is pus coming from the ear;
    - the person can no longer hear properly;
    - the person experiences balance problems;
    - you are in doubt.
4. Administer further first aid

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<sup>223</sup> ES Hygienic measures Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

- + Help the person to rest in a comfortable position (for example, sitting or half-sitting). Lying down usually makes the pain worse.
- + Ask the person not to rub his ears.
- + Let the person hold something warm against the ear, such as a hot water bottle, a gel heat pack or a cherry pit pillow. This may ease the pain. However, be wary of a possible burn.
- + Let the person take a simple painkiller if he so desires (EB<sup>224</sup>, weak recommendation, low quality evidence).
- + Wash your hands after administering first aid (EB<sup>225</sup>, strong recommendation, low quality evidence).

## 11. Foreign object in the nose

### What do you see?

- + The person may be experiencing difficulty breathing through the nose, or may be breathing loudly through the nose.
- + The person's nose may be swollen.
- + His eyes may be watering.
- + The injured person can if necessary pick his nose to try and remove the object.
- + Bad smelling or bloody nasal mucus indicates that there has been an object in the nose for some time.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the object does not come out;
    - o you think that the object has not been completely removed (for example, in the case of persistent pain, nosebleeds or if a bad smelling, bloody mucus is discharged from the nose after a while);
    - o you are in doubt.
4. Administer further first aid
  - + Never remove an object from the nose yourself with your fingers or any other tool. It is very likely that you will push the object further into the nose, thereby aggravating the injury.
  - + Ask the person to blow his nose while keeping his unblocked nostril closed.
  - + If the person is a child whom the first aider knows well, and who is too small to blow his nose himself, use the Parent's Kiss technique. You can also instruct the parents to use this technique.
  - + Wash your hands after administering first aid (EB<sup>226</sup>, strong recommendation).

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<sup>224</sup> ES Earache – paracetamol: p206 in summary book: There is limited evidence in favour of paracetamol.

<sup>225</sup> ES Hygienic measures Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>226</sup> Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

## 12. Toothache

### What do you see?

- + The person experiences pain when eating or drinking.
- + The pain may be constant, or sharp shooting pains may occur.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if the person has toothache.
4. Administer further first aid
  - + Let the person hold something warm against the cheek, such as a hot water bottle, a gel heat pack or a cherry pit pillow (EB<sup>227</sup>, weak recommendation). This may ease the pain. However, be wary of a possible burn.
  - + Let the person take a simple painkiller if he so desires.
  - + Wash your hands after administering first aid (EB<sup>228</sup>, strong recommendation).

## 13. Sore throat

### What do you see?

- + The person experiences pain when swallowing.
- + He may be hoarse.
- + In some cases a purulent deposit is visible at the back of the throat.
- + The lymph glands in the neck may be painful and swollen.
- + The ill person may have a fever.
- + If the sore throat is due to inflammation of the epiglottis, the ill person will have severe difficulty breathing.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the sore throat is present for several days without any clear improvement;
    - o the sore throat is accompanied by other symptoms such as fever, dehydration, painful neck or skin rash;
    - o the person cannot swallow enough to drink properly;

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<sup>227</sup> ES Toothache – heat application: p215 in summary book; ES Toothache – Cold application: p216 in summary book: There is no evidence for applying heat or cold. The expert panel therefore recommends applying heat.

<sup>228</sup> Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

- he has a frequently recurring sore throat;
  - you are in doubt.
  - + Call the emergency services on 112 if there is a danger of asphyxia.
4. Administer further first aid
- + Let the person drink plenty of water, but in little sips.
  - + Let the person use throat lozenges or a simple painkiller if he so desires. Consult a doctor or pharmacist when choosing a medicine. Always read the patient information leaflet (EB<sup>229</sup>, weak recommendation, low quality evidence).
  - + Do not look down the throat. Especially not if the person is having difficulty breathing, because this may further impair breathing.
  - + Wash your hands after administering first aid (EB<sup>230</sup>, strong recommendation, low quality evidence).

## 14. Headache

### What do you see?

- + The person has a headache.
- + He may also feel nauseous and vomit.
- + In some cases he will be drowsy and lose consciousness.
- + He may experience balance problems.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the person's breathing.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - the person has continuous headache or suffers from headache episodes, and simple painkillers cannot improve the headache;
    - the headache occurs during exertion or a change in position;
    - it is a severe headache that has occurred for the first time or gets worse very quickly (within seconds to minutes);
    - the headache is the result of a blow or punch to the head and gets visibly worse;
    - the headache is accompanied by other symptoms such as vomiting, a stiff neck, memory loss, impaired vision (double or blurred vision), fever, a droopy mouth, fits, reduced consciousness or loss of strength in an arm, leg or face.
4. Administer further first aid
  - + Eliminate the cause if possible (get out of the sun, drink sufficient amounts of water, eat something sugary ...).

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<sup>229</sup> ES Sore throat – paracetamol: p219 in summary book: There is limited evidence in favour of paracetamol.

<sup>230</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

## Head and neck

- + Let the person take a simple painkiller if he so desires (EB<sup>231</sup>, strong recommendation, moderate quality evidence).
- + Let the person rest in a cool and dark environment, especially if the painkiller does not help sufficiently.
- + Wash your hands after administering first aid (EB<sup>232</sup>, strong recommendation, low quality evidence).

### Summaries made for topics for which no evidence could be identified:

- Spine injury – Manual stabilisation using hands or knees: p185 in summary book. Syncope – Cold on forehead: p163 in summary book
- Epilepsy – object in mouth: p196 in summary book
- Eye injury – covering both eyes: p197 in summary book
- Earache – heat or cold application: p205 in summary book
- Earache – lying down: p212 in summary book
- Ear clearing – Toynbee technique: p208 in summary book
- Ear clearing – Valsalva technique: p209 in summary book
- Ear clearing – Yawning, swallowing, chewing gum: p210 in summary book
- Foreign object in nose: blowing the nose: p213 in summary book
- Foreign object in nose: parent's kiss: p214 in summary book
- Toothache – heat application: p215 in summary book
- Toothache – Cold application: p216 in summary book
- Toothache – Paracetamol: p217 in summary book
- Sore throat – drinking: p218 in summary book
- Headache – cool and dark environment: p229 in summary book

### Summaries for which studies have been identified but which have not resulted in a recommendation:

- Syncope – drinking: p165 in summary book

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<sup>231</sup> ES Headache – paracetamol: p225 in summary book: There is limited evidence in favour of paracetamol.

<sup>232</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

# Chest

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# 1. Heart disorders

## 1.1 Heart attack

### What do you see?

- + The ill person usually experiences painful pressure and tightness in the chest area (EB<sup>233</sup>, low quality evidence).
- + The pain that the ill person experiences may radiate to:
  - o the left or right arm (EB<sup>233</sup>, low quality evidence);
  - o the left or right shoulder and between the shoulder blades;
  - o the teeth and jaws;
  - o the abdominal area.
- + The ill person may be short of breath.
- + The ill person may have a pale or grey skin colour, with blue discoloration of the lips and finger nails.
- + He may sweat, be anxious and feel nauseous (EB<sup>233</sup>, low quality evidence).
- + A heart attack may begin with vague symptoms. There may also be aspecific symptoms (for example, pain the upper abdomen or flu-like complaints). It is even possible that a heart attack occurs without any symptoms.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
  - + Check whether the ill person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Always call the emergency services on 112.
  - + Even if the symptoms have disappeared within 5 minutes, you should still advise the ill person to seek help from a specialist. The general practitioner is often able to correctly assess the situation, because he knows the ill person and his medical history well.
4. Administer further first aid
  - + Let the ill person rest, with no further exertions. Ensure that he remains as calm as possible.
  - + Help the ill person to rest in a comfortable position (for example, sitting or half-sitting) (EB<sup>234</sup>, weak recommendation, moderate quality evidence). He does not necessarily have to sit on the ground, because that may require effort on his part. Ill people who are short of breath often feel best if they sit leaning forward with their elbows on the table.
  - + Ask if the ill person has ever experienced this kind of pain before, and if he is taking medication for it. Ask if he has taken medication already. Let the ill person take his medication if he so

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<sup>233</sup> ES Myocardial infarction – Clinical signs/symptoms: p233 in summary book: There is limited evidence showing that pain in the right arm/shoulder, pain in both arms and/or sweating are predictive symptoms for the presence of an acute myocardial infarction.

<sup>234</sup> ES Myocardial infarction – Body position: p231 in summary book: There is limited evidence either in favour of passive straight leg raising (60°) or the supine position. Expert opinion: Assume a comfortable position.

wishes. Ask him to respect the prescribed dose while doing so. Do not administer any medication yourself.

- + Ensure that the ill person can breathe freely. Loosen tight clothing.

## 1.2 Heart failure

### What do you see?

- + The ill person may quickly become short of breath (for example, upon exertion or when lying down).
- + He feels faint and tires easily.
- + Sometimes, in severe cases, you may here rattling breathing. This is due to pulmonary oedema (see Pulmonary oedema).
- + The ill person may have swollen legs and feet.

It is difficult for a first aider to tell the difference between heart failure and a heart attack. However, for the purposes of administering first aid, the difference is irrelevant.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
  - + Check whether the ill person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the ill person becomes out of breath more quickly;
    - o the person is less able to make physical effort;
    - o has swollen legs.
  - + Call the emergency services on 112 if:
    - o the ill person is very short of breath, especially if the symptoms also occur when at rest;
    - o you are in doubt about the severity of the symptoms.
  - + Even if the symptoms have disappeared within 5 minutes, you should still advise the ill person to seek help from a specialist. The general practitioner is often able to correctly assess the situation, because he knows the ill person and his medical history well.
4. Administer further first aid
  - + Let the ill person rest, with no further exertions. Ensure that he remains as calm as possible.
  - + Help the ill person to rest in a comfortable position (for example, sitting or half-sitting) (EB<sup>235</sup>, weak recommendation, moderate quality evidence). Ill people who are short of breath often feel best if they sit leaning forward with their elbows on the table.
  - + Ensure that the ill person can breathe freely. Loosen tight clothing.

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<sup>235</sup> ES Myocardial infarction – Body position: p231 in summary book: There is limited evidence neither in favour of passive straight leg raising (60°) nor the supine position. Expert opinion: Assume a comfortable position.

## 1.3 Cardiac arrhythmias

### What do you see?

- + The ill person may be suffering from heart palpitations. Sometimes he feels as though his heart 'skips a beat'.
- + The palpitations may be accompanied by a pressurised feeling on the chest, shortness of breath or feeling faint.
- + The ill person has a noticeably slow (heart rhythm too slow) or fast heart beat (heart rhythm too fast).
- + The ill person may be dizzy or tired.
- + The ill person may lose consciousness, as with a fainting fit.

It is difficult for a first aider to tell the difference between cardiac arrhythmias and a heart attack. However, for the purposes of administering first aid, the difference is irrelevant.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
  - + Check whether the ill person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services on 112 if you are in doubt about the severity of the symptoms, if the palpitations persist or if the ill person shows signs of impaired consciousness.
  - + Even if the symptoms have disappeared within 5 minutes, you should still advise the ill person to seek help from a specialist. The general practitioner is often able to correctly assess the situation, because he knows the ill person and his medical history.
4. Administer further first aid
  - + Let the ill person rest, with no further exertions. Ensure that he remains as calm as possible.
  - + Help the ill person to rest in a comfortable position (for example, sitting or half-sitting) (EB<sup>236</sup>, weak recommendation, moderate quality evidence).
  - + Ensure that the ill person can breathe freely. Loosen tight clothing.

## 2. Breathing difficulties

### What do you see?

- + Sometimes, there is an emotional cause for the complaints.
- + The person is breathing quickly and deeply.
- + He has a fast pulse, sometimes heart palpitations. He may feel stifled or dizzy.
- + The person often has a feeling of being short of breath, resulting in faster breathing. This may make his complaints worse.
- + He feels anxious or is agitated.
- + Sometimes he feels dizzy. He may have a feeling he is going to faint.
- + The person may feel nauseous.
- + Sometimes the person feels a tingling in his fingers and around the mouth.

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<sup>236</sup> ES Myocardial infarction – Body position: p231 in summary book: There is limited evidence neither in favour of passive straight leg raising (60°) nor the supine position. Expert opinion: Assume a comfortable position.

- + He has a feeling that there is a lump in his throat.
- + He may have a headache.
- + He may tremble and sweat.
- + He cannot think clearly.
- + If the episode lasts longer, the fingers and toes may cramp up.

### This is what you should do!

Only use the technique described below if you are sure that this is a panic attack (hyperventilation with a psychological cause, for example if the person tells you he is hyperventilating).

1. Make the area safe
2. Assess the condition of the person
  - + Find out what is wrong with the person. Does he have an injury or a disorder? Has he had panic attacks before? Is there any question of alcohol or drug use?
3. Seek help from a specialist
  - + Call the emergency services on 112 if:
    - o the panic attack persists;
    - o the hyperventilation does not have a psychological cause;
    - o the person has blueish-purple colouring;
    - o you are in doubt.
4. Administer further first aid
  - + Take the person to a quiet place if possible. Ask bystanders to keep their distance.
  - + Remove the cause of the panic attack if possible.
  - + Reassure the person. Behave very calmly. Move gently and predictably, speak slowly and use simple language.
  - + Calm the person down and ask him to gradually breath slowly and calmly in and out. Show him how and have the person copy your breathing rhythm. It may help to breathe in for 1 count via the nose, and to breath out for 3 counts via the mouth.
  - + Have the person fold his hands into a shell and breathe in and out into the shell. The aim of this technique is to normalise the balance between the amount of oxygen and carbon dioxide in the blood (increase the amount of carbon dioxide in the blood and decrease the amount of oxygen).
  - + If the person has become calmer and is more cooperative, let him hold a clean bag to his mouth and nose and breathe in and out of it. Only do this if you are sure that you are dealing with hyperventilation with a psychological cause and if the person allows you to do this. It can be a plastic or paper bag. Make sure that the bag is empty and clean, and does not contain any breadcrumbs, for instance. You can also have the ill person breathe in and out of a tube (EB<sup>237</sup>, weak recommendation, low quality evidence).
  - + Ensure that the person can breathe freely. Loosen tight clothing.
  - + Encourage the person to breathe from the abdomen (using the abdominal breathing muscles).
  - + Stay with the ill person until the episode is over and he is breathing normally again. Have him breathe in the surrounding air as soon as he feels calmer.

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<sup>237</sup> ES Hyperventilation – Breathing in a paper bag: p240 in summary book: There is limited evidence in favour of rebreathing in a paper bag.

## 2.1.1 Cough

### What do you see?

- + The person is coughing.
- + He has choked (see Choking).
- + He may have a dry tickly cough with very little mucous coming up (dry cough).
- + He may also cough up mucous (productive cough). The coughed up mucous may be clear, yellow-green or bloody.

### This is what you should do!

1. Make the area safe
  - + Advise the ill person to hold his hand over his mouth when coughing and to wash his hands frequently. This will prevent him infecting other people (EB<sup>238</sup>, strong recommendation, low quality evidence).
2. Assess the condition of the person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the cough persists or becomes painful;
    - o the person coughs up blood;
    - o the cough is accompanied by shortness of breath, wheezing, chest pain or clear signs of being unwell.
4. Administer further first aid
  - + Do not give cough syrup to the person unless recommended by a doctor. Cough syrups only alleviate the symptoms, not the underlying cause.
  - + A good level of humidity in the house reduces the risk of coughing. Inhaling warm, moist air (for example, over a bowl of hot water) makes it easier to cough up mucous.

## 2.1.2 Shortness of breath

### What do you see?

- + The person has difficulty breathing. He feels as though he cannot breath and gasps for air.
- + The person sometimes breathes too quickly.
- + He may cough, sometimes coughing up mucous.
- + The person may make a wheezing or rattling sound while breathing.
- + The person's nostrils make striking movements while he is breathing.
- + In some cases the neck and shoulder muscles may contract together with the breathing.
- + The person feels anxious or agitated.
- + He has a faster heart beat or palpitations.
- + There may be blue discoloration (cyanosis) of the lips, finger nails or nose.
- + The person or someone he knows may tell you that it is an asthma attack or chronic lung disease.

### This is what you should do!

1. Make the area safe

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<sup>238</sup> ES Hygienic measures – Respiratory illness: p24 in summary book: There is limited evidence in favour of hand washing.

2. Assess the condition of the person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the person's breathing.
3. Seek help from a specialist
  - + Seek help from a specialist if this is the first time that the person has suffered from shortness of breath.
  - + Call the emergency services on 112 if:
    - o the episode lasts several minutes;
    - o the person loses consciousness;
    - o the person's lips, finger nails or nose turn blue;
    - o the medication (puffer) has not had an effect 5 minutes after use and the situation remains serious.
4. Administer further first aid
  - + Reassure the person. Prevent him from panicking. Ask him to breathe as calmly as possible so that he does not use up extra oxygen.
  - + Let the person rest, with no further exertions. Ensure that he remains as calm as possible.
  - + Help the person to rest in a comfortable position (for example, sitting, half-sitting or standing). People who are short of breath often feel best if they sit leaning forward with their elbows on the table (EB<sup>239</sup>, weak recommendation, low quality evidence).
  - + Ensure that the person can breathe freely. Loosen tight clothing.
  - + Ask whether the person has had similar episodes in the past. Let him take his medication if he so wishes (for example, a puffer). Ask him while doing so to respect the dose and technique for taking the medication. Do not administer any medication yourself (EB<sup>240</sup>, weak recommendation, very low quality evidence).
  - + Stay with the person until the episode is over and he is breathing normally again.

## 2.2 Pathologies

### 2.2.1 Asthma and COPD

#### What do you see?

- + The person has difficulty breathing. He feels as though he can't breathe and gasps for air.
- + The person sometimes breathes too fast.
- + He may cough, sometimes coughing up mucous.
- + The person may make a wheezing or rattling sound while breathing.
- + The person's nostrils make pronounced movements while he is breathing.
- + In some cases the neck and shoulder muscles may contract together with the breathing.
- + The person feels anxious or agitated.
- + He has a faster heart beat or palpitations.
- + He may have a fever.
- + Sometimes blue discoloration of the lips, finger nails or nose occurs.

<sup>239</sup> ES Dyspnoea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

<sup>240</sup> ILCOR FA 534: Bronchilator use for asthma with difficulty breathing: When an individual with asthma is experiencing difficulty breathing, we suggest that trained first aid providers assist the individual with administration of a bronchodilator.

## Chest

- + The person or someone he knows may tell you that he is having an asthma attack or suffers from chronic lung disease.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Check the person's breathing.
3. Seek help from a specialist
  - + Call the emergency services on 112 if:
    - o the attack lasts several minutes;
    - o the person loses consciousness;
    - o the lips, finger nails or nose of the person turn blue;
    - o the medication (puffer) has not had an effect 5 minutes after use and the situation remains serious.
4. Administer further first aid
  - + Reassure the person. Prevent him from panicking. Ask him to breathe as calmly as possible so that he does not use up extra oxygen.
  - + Let the person rest, with no further exertions. Ensure that he remains as calm as possible.
  - + Help the person to rest in a comfortable position (for example, sitting, half-sitting or standing). People who are short of breath often feel best if they sit leaning forward with their elbows on the table (EB<sup>241</sup>, weak recommendation, low quality evidence).
  - + Ensure that the person can breathe freely. Loosen tight clothing.
  - + Ask whether the person has had similar attacks in the past. Let him take his medication if he so wishes (for example, a puffer). Ask him while doing so to respect the dose and correct technique for taking the medication. Do not administer any medication yourself (EB<sup>242</sup>, weak recommendation, very low quality evidence).
  - + Stay with the person until the attack is over and he is breathing normally again.

## 2.2.2 Pneumonia

### What do you see?

- + The ill person is having difficulty breathing.
- + The ill person has to cough frequently.
- + He has chest pain.
- + He has a fever.
- + He feels tired.
- + He has a reduced appetite.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person

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<sup>241</sup> ES Dyspnoea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

<sup>242</sup> ILCOR FA 534: Bronchilator use for asthma with difficulty breathing: When an individual with asthma is experiencing difficulty breathing, we suggest that trained first aid providers assist the individual with administration of a bronchodilator.

- + Find out what is wrong with the ill person.
  - + Check whether the ill person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
    - + Refer the ill person to the general practitioner.
    - + Call the emergency services on 112 if:
      - o the ill person is having difficulty breathing;
      - o you observe impaired consciousness.
  4. Administer further first aid
    - + Let the ill person rest, with no further exertions. Ensure that he remains as calm as possible.
    - + Help the ill person to rest in a comfortable position (for example, sitting or half-sitting).
    - + Ensure that the ill person can breathe freely. Loosen tight clothing.

## 2.2.3 Pulmonary oedema

### What do you see?

- + The person is short of breath: he has difficulty breathing, feels like he cannot breathe and gasps for air.
- + The person sometimes breathes too fast.
- + The person feels anxious or agitated.
- + His breathing may produce a rattling noise, and he may cough up foamy pink mucous.
- + There may be blue discoloration (cyanosis) of the lips, finger nails or nose.
- + The person may show signs of shock.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the person's breathing.
3. Seek help from a specialist
  - + Call the emergency services on 112.
4. Administer further first aid
  - + Reassure the person. Prevent him from panicking. Ask him to stay as calm as possible.
  - + Help the person to rest in a comfortable position (for example, sitting, half-sitting or standing). People who are short of breath often feel best if they sit leaning forward with their elbows on the table (EB<sup>243</sup>, weak recommendation, low quality evidence).
  - + Ensure that the person can breathe freely. Loosen tight clothing.

## 2.2.4 Pulmonary embolism

### What do you see?

In the case of a small pulmonary embolism there are usually no symptoms, or the symptoms are transitory. In other cases, the following symptoms may be observed:

- + The ill person experiences sudden pain when breathing.

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<sup>243</sup> ES Dyspnoea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

## Chest

- + The ill person is short of breath: he has difficulty breathing, feels like he can't breathe and gasps for air.
- + His breathing may produce a rattling noise, and he may cough up foamy pink mucous.
- + There may be blue discoloration (cyanosis) of the lips, finger nails or nose.
- + The ill person may show signs of shock.

As a first aider, it is usually difficult to detect a pulmonary embolism. Therefore, act in function of the symptoms that you observe.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
  - + Check whether the ill person is conscious.
  - + Open the airway and check the ill person's breathing.
3. Seek help from a specialist
  - + Call the emergency services on 112.
4. Administer further first aid
  - + Reassure the ill person. Prevent him from panicking. Ask him to stay as calm as possible.
  - + Help the ill person to rest in a comfortable position (for example, sitting, half-sitting or standing). People who are short of breath often feel best if they sit leaning forward with their elbows on the table (EB<sup>244</sup>, weak recommendation, low quality evidence).
  - + Ensure that the ill person can breathe freely. Loosen tight clothing.

## 2.2.5 Collapsed lung (pneumothorax)

### What do you see?

- + The ill person experiences a sudden sharp pain when breathing.
- + The ill person may be short of breath: he has difficulty breathing, feels like he cannot breathe and gasps for air.
- + The ill person experiences a tight chest feeling.
- + The chest moves asymmetrically when breathing (on the side of the collapsed lung, the chest expands less).
- + The veins in the neck may stand out.
- + The skin around the wound and in the neck may feel like crunching snow (crepitus). This occurs due to the accumulation of air in the subcutaneous tissues. This is a typical symptom of a collapsed lung.
- + In some cases, you will see a chest wound.

### This is what you should do!

1. Make the area safe
  - + Reassure the ill person. Prevent him from panicking. Ask him to stay as calm as possible.
  - + If there is a visible wound:
    - o Ask the ill person to put pressure on the wound himself if possible.
    - o Put on disposable gloves.
2. Assess the condition of the ill person

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<sup>244</sup> ES Dyspnoea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

- + Find out what is wrong with the ill person.
  - + Check whether the ill person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
    - + Call the emergency services on 112.
  4. Administer further first aid
    - + If there is a visible wound: now put pressure on the wound yourself, using your hands.
    - + Help the ill person to rest in a comfortable position. This is usually a half-sitting position, in which he will lie slightly angled on the wounded side to allow the other lung to function to its maximum (EB<sup>245</sup>, weak recommendation, low quality evidence).
    - + If the ill person loses consciousness, put him in the recovery position on the painful side. This will allow the other lung to vouch for breathing (EB<sup>246</sup>, weak recommendation, very low quality evidence).
    - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>247</sup>, strong recommendation, low quality evidence).

## 2.2.6 Flail chest

### What do you see?

- + The injured person suffered a blow with a blunt object, or has experienced an impact due to a fall or a traffic accident.
- + The injured person complains of chest pain.
- + The injured person exhibits paradoxical breathing: the chest is sucked partly inwards when inhaling, and expands when exhaling.
- + After a short while, you may observe subcutaneous bleeding in the site where the ribs are broken.
- + The injured person is having difficulty breathing.
- + There may be signs of shock.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services on 112.
4. Administer further first aid
  - + Let the injured person rest, with no further exertions. Ensure that he remains as calm as possible.
  - + Help the injured person to rest in a comfortable position (for example, sitting or half-sitting).

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<sup>245</sup> ES Dyspnoea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

<sup>246</sup> ILCOR FA 517: Recovery position: We suggest that first aid providers position individuals who are unresponsive and breathing normally into a lateral, sidelying recovery (lateral recumbent) position as opposed to leaving them supine.

<sup>247</sup> ES Hygienic measures – Respiratory illness: p24 in summary book: There is limited evidence in favour of hand washing.

- + Ensure that the injured person can breathe freely. Loosen tight clothing.

## 2.2.7 Haemothorax

### What do you see?

- + The injured person suffered a blow with a blunt object, or has experienced an impact due to a fall or a traffic accident.
- + The injured person complains of chest pain.
- + The injured person complains of a tickly cough.
- + In the case of a severe haemothorax, the shortness of breath increases.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services on 112.
4. Administer further first aid
  - + Let the injured person rest, with no further exertions. Ensure that he remains as calm as possible.
  - + Help the injured person to rest in a comfortable position (for example, sitting or half-sitting) (EB<sup>248</sup>, weak recommendation, low quality evidence)
  - + Ensure that the injured person can breathe freely. Loosen tight clothing.

## 2.2.8 Inhaled object

### What do you see?

- + At the moment of inhalation, there are usually no symptoms. The inhalation of an object often passes unnoticed.
- + The ill person may show signs of a mild airway obstruction (see Choking).
- + He may cough and experience difficulty breathing.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the object cannot be coughed up;
    - o the person continues coughing, has problems swallowing or has the feeling that there is something in his throat;
    - o his breathing is noisy (wheezing, rattling, abrasive);

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<sup>248</sup> ES Dyspnoea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

- after a while, the person suffers from a fever or breathing problems (shortness of breath, cough, chest pain).
4. Administer further first aid
    - + Encourage the person to cough. If this does not help, treat as for choking (see Choking).
    - + Continue to monitor the injured person until he starts breathing normally again.

## 2.2.9 Choking

### 2.2.9.1 Mild airway obstruction

#### What do you see?

- + The person has choked.
- + He speaks, coughs, cries or breathes.

#### This is what you should do!

1. Make the area safe
2. Assess the condition of the person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the breathing.
3. Seek help from a specialist
  - + Seek help from a specialist if, after the object has been removed, the injured person does the following:
    - continues to cough;
    - has difficulty swallowing;
    - has a feeling there is something in his throat.
    - There may be a piece left behind in his trachea.
  - + Call the emergency services on 112 if the person loses consciousness.
4. Administer further first aid
  - + Encourage the person to cough. Coughing creates a strong and persistent pressure in the airways and may help to eject the foreign object.
  - + Continue to monitor the person until he starts breathing normally again.

### 2.2.9.2 Severe airway obstruction

#### What do you see?

- + The person has choked.
- + He cannot talk, cough, cry or breathe.
- + The person makes coughing gestures without any sound.
- + The person's face may turn blue.
- + He gradually loses consciousness.

#### This is what you should do!

1. Make the area safe
2. Assess the condition of the person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the breathing.

3. Seek help from a specialist
  - + Seek help from a specialist if the person has received abdominal thrusts. Abdominal thrusts can cause serious internal injuries. Someone who has received abdominal thrusts should be examined by a doctor.
  - + Call the emergency services on 112 if the injured person loses consciousness.
4. Administer further first aid
  - + If the person is conscious and coughing is no longer effective, administer 5 blows to the back.
  - + If the airway is still blocked after administering 5 blows to the back, administer abdominal thrusts (or abdominal compressions). Repeat this up to 5 times.
  - + If this does not resolve the problem, alternate between administering blows to the back and abdominal thrusts.
  - + If the person stops responding and becomes unconscious, lie him carefully on the ground and start resuscitation (see Resuscitation).

## 2.2.10 Breath-holding spells

### What do you see?

- + The child inhales, but does not exhale.
- + He turns blue or pale.
- + He tenses his muscles.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the person
  - + Find out what is wrong with the child.
3. Seek help from a specialist
  - + Call the emergency services on 112 if the child becomes unconscious and does not come round after 2 minutes. After a fainting episode, he will automatically start to breathe again.
4. Administer further first aid
  - + Blow in the child's face to startle him.
  - + If the tantrum persists, give the child a 'time-out'. This means taking the child away from the situation in which the tantrum began, to a quiet but safe area so that he can calm down.
  - + If the child becomes unconscious, he will begin breathing normally again by himself. Place him in the recovery position and check consciousness and breathing every minute. Treat as you would any unconscious person (EB<sup>249</sup>, weak recommendation, very low quality evidence).

## 2.3 Chest injuries

### 2.3.1 Rib fracture

#### What do you see?

- + The injured person suffers pain in the area of the fracture, especially when breathing in.
- + His breathing is superficial. He may experience sharp pain when breathing.
- + You may observe paradoxal breathing in some cases.

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<sup>249</sup> ILCOR FA 517: Recovery position: We suggest that first aid providers position individuals who are unresponsive and breathing normally into a lateral, sidelying recovery (lateral recumbent) position as opposed to leaving them supine.

## Chest

- + The injured person may breathe faster than normal and usually more superficially and irregularly as well. He may experience sharp pain when breathing. He may not be able to form whole sentences in one breath. He may experience problems breathing and feel as though he cannot breathe. The injured person may make a wheezing or rattling sound while breathing.
- + The injured person's nostrils make pronounced movements while he is breathing.
- + In some cases the neck and shoulder muscles may contract together with the breathing.
- + You may see a bruise or wound on the chest in some cases.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services on 112.
4. Administer further first aid
  - + Let the injured person rest, with no further exertions. Reassure the injured person.
  - + Prevent him from panicking. Ask him to stay as calm as possible.
  - + Check if there are any wounds to the chest. If there are, put pressure on the wound with your hands to staunch the bleeding (see Bleeding) (EB<sup>250</sup>, weak recommendation, very low quality evidence).
  - + Help the injured person to rest in a comfortable position. This is usually a half-sitting position, in which he will lie at a slight angle on the wounded side to allow the other lung to function to its maximum. People who are short of breath often feel best if they sit leaning forward. Under no circumstances should you force them to lie down.
  - + Have the injured person support the painful area with his hand and put slight pressure on it.
  - + While waiting for specialized help, cool a bruise or fracture for a maximum of 20 minutes with ice cubes in a bag of water or a cool bag to reduce the swelling and pain. While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Use a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. If you do not have any ice, use cold water.
  - + Stop cooling if it bothers the injured person. If the pain recurs, you can cool the wound again, as long as the skin is back to a normal temperature.

If the injured person loses consciousness, place him in the recovery position on the painful side. This will allow the lung on the other side to vouch for breathing (EB<sup>251</sup>, weak recommendation, very low quality evidence).

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<sup>250</sup> ILCOR FA 525: First aid treatment for an open chest wound. We suggest against the application of an occlusive dressing or device by first aid providers to individuals with an open chest wound.

<sup>251</sup> ILCOR FA 517: Recovery position: We suggest that first aid providers position individuals who are unresponsive and breathing normally into a lateral, sidelying recovery (lateral recumbent) position as opposed to leaving them supine.

## 2.3.2 Chest wound

### What do you see?

- + You may observe bruising or a wound to the chest. There is visible blood loss.
- + Air is escaping from the wound when the injured person breathes and you can see air bubbles on the wound (for example, in the case of a stab or gunshot wound).
- + The injured person may breathe faster than normal and usually more superficially and irregularly as well. He may experience sharp pain when breathing. He may not be able to form whole sentences in one breath. He may experience problems breathing and feel as though he cannot breathe. The injured person may make a wheezing or rattling sound while breathing.
- + The injured person's nostrils make pronounced movements while he is breathing.
- + In some cases the neck and shoulder muscles may contract together with the breathing.
- + Sometimes, blue discoloration (cyanosis) of the lips, finger nails or nose occurs.
- + He may cough, sometimes coughing up mucous. The injured person coughs up bloody foam.
- + The veins in the neck are clearly visible.
- + The skin around the wound and in the neck may feel like crunching snow (crepitus).
- + This occurs due to the accumulation of air in the subcutaneous tissues.
- + The injured person may show signs of shock.
- + The injured person feels anxious or agitated.
- + He may have a faster heart beat or experience palpitations. There may also be chest pain.

### This is what you should do!

1. Make the area safe
  - + Ask the injured person to put pressure on the wound himself if possible.
  - + Put on disposable gloves (EB<sup>252</sup>, strong recommendation, moderate quality evidence).
  - + Help the injured person to lie on the ground while he puts pressure on the wound.
  - + Reassure the injured person. Prevent him from panicking. Ask him to stay as calm as possible.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Ask someone to call the emergency services on 112. Do this yourself if you are alone. At the same time make, sure the injured person continues to put pressure on his wound with his hands. If that does not work, put pressure on the wound with your own hands and if necessary use the loudspeaker function on your mobile phone to make the call (EB<sup>253</sup>, weak recommendation).
4. Administer further first aid
  - + Put pressure on the wound with your own hands. Do not use a compressor other bandage to press on the wound. After all, it is not recommended to use an occlusive bandage. You could however use a non-occlusive bandage, but because this quickly becomes occlusive, we do not recommend it (for example, a compress that becomes wet from the blood, also acts as an occlusive bandage) (EB<sup>254</sup>, weak recommendation, very low quality evidence).

<sup>252</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is evidence in favour of using gloves.

<sup>253</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence neither in favour of manual compression nor vascular closing devices.

<sup>254</sup> ILCOR FA 525: First aid treatment for an open chest wound. We suggest against the application of an occlusive dressing or device by first aid providers to individuals with an open chest wound.

- + Never remove foreign objects from the wound.
- + Help the injured person to rest in a comfortable position. This is usually a half-sitting position, in which he will lie at a slight angle on the wounded side to allow the other lung to function to its maximum (EB<sup>255</sup>, weak recommendation, low quality evidence).
- + If the injured person loses consciousness, place him in the recovery position on the painful side. This will allow the other lung to vouch for breathing (EB<sup>256</sup>, weak recommendation, very low quality evidence).
- + Continue to apply pressure to the wound until the emergency services arrive.
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>257</sup>, strong recommendation, low quality evidence).

### Summaries made for topics for which no evidence could be identified:

- Hyperventilation – Calmly breathing (First Aid): p242 in summary book Hyperventilation – Calmly breathing (Prevention): p244 in summary book
- Hyperventilation – Activity (Prevention): p246 in summary book
- Hyperventilation – Distraction (Prevention): p247 in summary book
- Coughing – Covering mouth (Prevention): p256 in summary book
- Coughing – Risk factors: p257 in summary book
- Coughing – Warm humid air: p255 in summary book
- Asthma and COPD – Calmly breathing (First Aid): p253 in summary book
- Breath-holding spells – Blowing in the face (First Aid): p259 in summary book
- Breath-holding spells – Removing child from the situation (First Aid): p260 in summary book
- Rib fractures – Light pressure on painful spot (First Aid): p259 in summary book

### Summaries for which studies have been identified but which have not resulted in a recommendation:

- Dyspnoea – Cold humidified air (First Aid): p251 in summary book

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<sup>255</sup> ES Dyspnoea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

<sup>256</sup> ILCOR FA 517: Recovery position: We suggest that first aid providers position individuals who are unresponsive and breathing normally into a lateral, sidelying recovery (lateral recumbent) position as opposed to leaving them supine.

<sup>257</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

# Abdomen and back

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# 1. Stomach pain

## What do you see?

Regardless of the cause of the stomach pain, you will often observe similar symptoms in the ill person.

- + The person is suffering from pain or irritation in the abdomen. The pain may manifest in various ways: in a specific site or across the entire abdomen, stabbing or dull pain, persistent pain or intermittent pain ... The pain may in some cases radiate to the back, shoulder or genitals.  
A specialized care provider will also refer to rebound tenderness (if you touch the painful site and subsequently remove your hand, the person will experience pain again) and colic (bouts of severe pain). In the case of renal colic, the person will be doubled up with the pain.
- + The person may feel nauseous, vomit and suffer from cramps and/or acid regurgitation.
- + The person may vomit blood. His vomit may also have the appearance of black coffee grinds, and smell sour.
- + He may suffer from diarrhoea or constipation.
- + The person's stools may be black in colour, in the case of a severe abdominal bleed.
- + The person has no appetite and feels sick.
- + His skin and mucous membranes may be pale (pale tongue, gums ...) in the case of a severe abdominal bleed.
- + The person has not suffered a blow to the abdominal region.

## This is what you should do!

The first aid treatment for abdominal pain is the same regardless of the cause of the stomachache.

1. Make the area safe
  - + Put on disposable gloves if the ill person is feeling nauseous.
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
  - + Check whether the ill person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Call the emergency services
  - + Seek help from a specialist in the case of a minor stomachache that is persistent, in the case of severe abdominal pain or if you are in doubt.
  - + Call the emergency services on 112 in the case of severe abdominal pain in combination with other symptoms (for example, if the ill person has a hard, tense or swollen stomach, or if the ill person is losing consciousness) or if you are in doubt.
4. Administer further first aid
  - + Does the ill person have minor abdominal pain?

<b>Yes: minor abdominal pain.</b>	<b>No: severe abdominal pain.</b>
<ul style="list-style-type: none"> <li>+ Help the ill person find the most comfortable position. This is usually a lying position with drawn up knees (this reduces tension on the abdomen) or a half-sitting position. If the ill person has acid regurgitation, it may help to lie on the right side and raise the head on a pillow.</li> <li>+ Give the ill person a chance to freshen up if he has vomited (see Vomiting).</li> </ul>	<ul style="list-style-type: none"> <li>+ Do not give the ill person anything to eat or drink.</li> <li>+ Help the ill person find the most comfortable position. This is usually a lying position with drawn-up knees. This reduces tension on the abdomen. In the case of serious abdominal cramps, lying on the right side with drawn up knees may</li> </ul>

<ul style="list-style-type: none"> <li>+ Advise the ill person to avoid strong tasting or highly spiced food (EB<sup>258</sup>, weak recommendation, low quality evidence). Also advise against drinking fizzy drinks.</li> <li>+ Do not lie down in the event of pain following a meal (move instead) (EB<sup>259</sup>, weak recommendation, low quality evidence).</li> <li>+ In the case of abdominal pain caused by menstruation:             <ul style="list-style-type: none"> <li>o Exercise sufficiently (for example, walking, jogging or swimming) (EB<sup>260</sup>, strong recommendation, moderate quality evidence).</li> <li>o Apply warmth to the abdomen in the form of warm clothing or a heat pouch (see Cold Pouch) (EB<sup>261</sup>, strong recommendation, moderate quality evidence).</li> <li>o Advise the ill person to eat low-fat, and if possible, vegetarian meals. A diet of fish, fruit and vegetables and tea helps reduce the chance of painful menstruation. Avoid a high-fat, high-sugar diet as well as alcohol (EB<sup>262</sup>, strong recommendation, moderate quality evidence).</li> </ul> </li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>263</sup>, strong recommendation, moderate quality evidence).</li> </ul>	<p>alleviate the pain (EB<sup>264</sup>, weak recommendation, low quality evidence).</p> <ul style="list-style-type: none"> <li>+ Give the ill person a chance to freshen up if he has vomited (see Vomiting).</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>265</sup>, strong recommendation, moderate quality evidence).</li> </ul>
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<sup>258</sup> ES Stomach pain – Eating a spicy meal: p268 in summary book: There is limited evidence in favour of meals containing no chili (powder). There is limited evidence showing no difference between meals containing peppermint oil and meal containing no peppermint oil.

<sup>259</sup> ES Stomach pain – Physical activity: p271 in summary book: There is limited evidence in favour of being active (e.g. walking) after having a meal.

<sup>260</sup> ES Menstruation (dysmenorrhea) – Exercise: p300 in summary book: There is evidence in favour of performing aerobic exercises and stretching exercises. There is limited evidence showing no difference between performing isometric exercises and no exercise.

<sup>261</sup> ES Menstruation (dysmenorrhea) – Heat application: p313 in summary book: There is evidence in favour of heat application.

<sup>262</sup> ES Menstruation (dysmenorrhea) – food: p304 in summary book: There is evidence in favour of low fat (vegetarian) meal. There is limited evidence in favour of eating higher amounts of fish/fruits, a lower sugar/cheese intake, avoiding cola/chocolate or drinking tea. There is limited evidence neither in favour of eating lower vs higher amounts of pasta/meat, drinking coffee nor not. There is limited evidence in favour of drinking no alcohol.

<sup>263</sup> ES Diarrhoea – Hand washing: p323 in summary book: There is evidence in favour of hand washing.

<sup>264</sup> ES Stomach pain – Posture: p262 in summary book: There is limited evidence in favour of the sitting position (combined with standing) (compared to supine position). There is limited evidence in favour of the prone and right lateral position (compared to supine position).

<sup>265</sup> ES Diarrhoea – Hand washing: p323 in summary book: There is evidence in favour of hand washing.

## Preventing abdominal pain

- + Avoid large or high-fat meals (EB<sup>266</sup>, weak recommendation, low to very low quality evidence).
- + If you regularly suffer from acid regurgitation, avoid the following:
  - o alcohol before, during or after the meal; alcohol slows down gastric emptying (EB<sup>267</sup>, weak recommendation, low quality evidence);
  - o chocolate or buttermilk; these foods also slow down gastric emptying;
  - o spicy meals.
- + A cup of coffee during or after the meal may improve digestion (EB<sup>268</sup>, weak recommendation, low quality evidence).
- + Be active after a meal: do not lie down or sit at the table for too long. Move: take a walk for example (EB<sup>269</sup>, weak recommendation, low quality evidence).
- + In order to prevent the feeling of being bloated, chew your food well during a meal (EB<sup>270</sup>, weak recommendation, low quality evidence). It also helps to chew on gum after a meal (EB<sup>271</sup>, strong recommendation, moderate quality evidence).
- + Do not eat too late in the evening: have a meal at least 3 to 4 hours before going to sleep (EB<sup>272</sup>, weak recommendation, low quality evidence).

# 2. Vomiting and diarrhoea

## 2.1 Vomiting

### What do you see?

- + The person is vomiting (or feels nauseous). The vomit may contain undigested food, mucous and blood.
- + He may have a fever and may be sweating.
- + He feels weak and ill.
- + He may have diarrhoea.
- + The person's abdomen may be swollen.
- + The person may have stomachache.

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<sup>266</sup> ES Stomach pain – Large/high caloric/high-fat meal: p279 in summary book: There is limited evidence in favour of a low-caloric or low-fat meal. There is limited evidence in favour of a small meal.

<sup>267</sup> ES Stomach pain – Drinking alcohol: p289 in summary book: There is limited evidence in favour of drinking no alcohol before, during and after a meal.

<sup>268</sup> ES Stomach pain – Drinking coffee: p274 in summary book: There is limited evidence in favour of drinking coffee during or after the meal. There is limited evidence neither in favour of drinking coffee nor drinking water before the meal.

<sup>269</sup> ES Stomach pain – Physical activity: p271 in summary book: There is limited evidence in favour of being active (e.g. walking) after having a meal.

<sup>270</sup> ES Stomach pain – Chewing during eating or using chewing gum: p285 in summary book: There is limited evidence in favour of chewing food at a higher frequency.

<sup>271</sup> ES Stomach pain – Chewing during eating or using chewing gum: p285 in summary book: There is limited evidence in favour of chewing gum after a meal.

<sup>272</sup> ES Stomach pain – Eating in the evening (timing): p296 in summary book: There is limited evidence in favour of eating earlier prior to going to bed.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>273</sup>, strong recommendation, moderate quality evidence).
  - + Pass the ill person something to vomit into (for example, a bucket, a sick bag, a kidney dish or a plastic bag).
2. Assess the condition of the ill person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the overall condition of the person deteriorates;
    - o the ill person is taking important medication (for example, heart or diabetes medication);
    - o there is blood in the vomit or the vomit is black (this is old blood, looks like coffee grounds);
    - o the vomiting is accompanied by fever;
    - o the vomiting is accompanied by diarrhoea;
    - o the vomiting is accompanied by severe abdominal pain;
    - o the ill person is a young child or an elderly person;
    - o you are in doubt.
4. Administer further first aid
  - + Help the ill person to move if possible and desirable (for example, to the bathroom or toilet).
  - + Check if the ill person has other symptoms (for example, fever, diarrhoea or severe abdominal cramps).
  - + Help the person find the most comfortable position (EB<sup>274</sup>, weak recommendation, low quality evidence).
  - + Give the ill person a chance to freshen up if he has vomited (see Vomiting).
  - + Clean up the vomit and if necessary help replace the clothing and/or bed linen of the ill person.
  - + When the vomiting has stopped, try to prevent dehydration and advise the ill person to drink regular small amounts of water or a sports drink. Do not use (flat) cola.
  - + Advise the ill person not to eat for a few hours. If he feels better, he can eat a light meal (for example, yoghurt, a sandwich, a cracker ...).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>273</sup>, strong recommendation, moderate quality evidence).

When administering help to an ill person who is vomiting, it is important to avoid becoming infected yourself. You can do this by wearing disposable gloves if there is a possibility of coming into contact with the vomit. After contact with the ill person, wash your hands thoroughly with water and soap (EB<sup>281</sup>, strong recommendation, moderate quality evidence). Additionally, you can also use hand alcohol to disinfect your hands (EB<sup>275</sup>, weak recommendation, low quality evidence).

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<sup>273</sup> ES Diarrhoea – Hand washing: p323 in summary book: There is evidence in favour of hand washing.

<sup>274</sup> ES Vomiting – Posture: p315 in summary book: There is limited evidence neither in favour of the knee-chest position nor the sitting position. Experts recommend finding the most comfortable position.

<sup>275</sup> ES Diarrhoea – Hand sanitisers: p326 in summary book: There is limited evidence in favour of alcohol based hand sanitisers.

## 2.2 Diarrhoea

### What do you see?

- + The person has liquid, watery, thin stools.
- + He has a frequent urge to defecate and sometimes has difficulty controlling this urge.
- + Diarrhoea is often accompanied by stomach cramps. The person may also have to vomit.
- + He may have a fever and may be sweating.
- + He feels weak and ill.
- + The person's abdomen may be swollen.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>276</sup>, strong recommendation, moderate quality evidence).
2. Assess the condition of the ill person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the overall condition of the ill person deteriorates;
    - o the ill person is taking important medication (for example, heart or diabetes medication);
    - o he exhibits alarming symptoms: bloody diarrhoea, pus in the stools, high fever (more than 38.5 °C) or severe cramps;
    - o the ill person is pregnant;
    - o the ill person is a young child or an elderly person;
    - o you are in doubt.
4. Administer further first aid
  - + Help the ill person to move, if possible (for example, to the toilet).
  - + Check if the ill person has other symptoms (for example, fever, vomiting or severe abdominal cramps).
  - + If necessary, help replace the clothing and/or bed linen of the ill person.
  - + Try to prevent dehydration and advise the ill person to drink regular small amounts of water. Other good options are sports drinks, tea or a light bouillon (EB<sup>277</sup>, weak recommendation, very low quality evidence). This is an exception to principle 4 of first aid (see Making the ill or injured person comfortable). Do not use (flat) cola (EB<sup>278</sup>, weak recommendation, very low quality evidence). Babies and young children with a mild form of diarrhoea can just continue to drink undiluted milk.  
If you observe signs of dehydration, administer the appropriate first aid for dehydration (see Dehydration).

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<sup>276</sup> ES Diarrhoea – Hand washing: p323 in summary book: There is evidence in favour of hand washing.

<sup>277</sup> ILCOR FA 584: Exertion-related dehydration therapy: We suggest that first aid providers use 3% to 8% CE drinks for treating exertion-related dehydration. If 3% to 8% CE drinks are not available or not tolerated, alternative beverages for rehydration include water, 12% CE solution, coconut water, 2% milk, tea, tea-CE, or caffeinated tea beverages.

<sup>278</sup> ES Dehydration – Drinking carbonated drinks: p412 in summary book: There is limited evidence in favour of not drinking carbonated beverages for the outcomes urinary Na<sup>+</sup> loss, urine Ca<sup>2+</sup> loss and urine Mg<sup>2+</sup> loss, total body weight and rehydration. There is limited evidence neither in favour of drinking carbonated beverages nor drinking water for the outcomes fluid retention, total body water, extracellular or intracellular body water, total blood volume, serum osmolality, serum haemoglobin, serum haematocrit, serum Na<sup>+</sup>, Cl<sup>-</sup>, K<sup>+</sup> levels, serum urea nitrogen levels, serum creatinine levels or serum protein levels.

- + If the person so desires, he may eat something. He can eat whatever he likes. Advise him not to eat or drink spicy or gas-forming foods. For example, most people are sensitive to certain spices (pepper, sambal, paprika, garlic), strong coffee, alcohol, onions, leek, brassica and sprouts.
- + If the ill person frequently suffers from disturbing diarrhoea, with no other significant symptoms, he can take medication to prevent diarrhoea. Consult a general practitioner or pharmacist for advice.
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>279</sup>, strong recommendation, moderate quality evidence).

## Preventing diarrhoea

- + Wash your hands frequently with water and soap (EB<sup>279</sup>, strong recommendation). Especially in the following cases:
  - o after contact with someone who is vomiting or has diarrhoea (EB<sup>280</sup>, weak recommendation, very low quality evidence);
  - o after using the toilet;
  - o before, during and after cooking (when touching food) (EB<sup>281</sup>, weak recommendation, very low quality evidence);
  - o before a meal;
  - o after contact with animals (EB<sup>280</sup>, weak recommendation, very low quality evidence).Additionally, you can also use hand alcohol to disinfect your hands (EB<sup>282</sup>, weak recommendation, low quality evidence).
- + In our country, tap water is safe to drink. However, do not use tap water if the conditions are not hygienic (for example, in some countries abroad) (EB<sup>283</sup>, weak recommendation, very low quality evidence). Consult a travel guide or tourist office before you leave. Where possible, drink bottled water that you have opened yourself (or that is opened in your presence). Avoid ice cubes in these circumstances too, as these may be made with unclean water. If there is no bottled water available, the water will have to be boiled or sterilised. This is especially important for adventurous travellers. By taking the following measures, you will reduce the risk of infection (EB<sup>284</sup>, strong recommendation, moderate quality evidence):
  - o filter visibly cloudy water (for example, by using a coffee filter) before sterilising or boiling it;
  - o bring the water to the boil (you will see large air bubbles);
  - o clean the water in a special water filter for adventurous travellers (ask for expert advice on how to use them);

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<sup>279</sup> ES Diarrhoea – Hand washing: p323 in summary book: There is evidence in favour of hand washing.

<sup>280</sup> ES Diarrhoea & Dehydration – Contact: p367 in summary book: It was shown that the following risk factors resulted in a statistically significant increased risk of *Campylobacter/Cryptosporidium/E. coli* O157:H7 infection or risk of diarrhoea: children <6 yr at home with diarrhoea, persons >5 yr at home with diarrhoea, contact with household member with diarrhoeal illness, contact with non-household member with diarrhoeal illness, contact with ill person past 2 weeks, dog had diarrhoea, having a pet with diarrhoea.

<sup>281</sup> ES Diarrhoea & Dehydration – Kitchen hygiene: p396 in summary book: it was shown that not washing hands after handling raw ground beef resulted in a statistically significant increased risk of *E. coli* O157:H7 infection.

<sup>282</sup> ES Diarrhoea – Hand sanitizers: p326 in summary book: There is limited evidence in favour of alcohol based hand sanitizers.

<sup>283</sup> ES Diarrhoea & Dehydration – drinking and swimming: p377 in summary book: There is conflicting evidence concerning drinking tap water. Expert opinion: Do not use tap water in the event of poor hygienic conditions.

<sup>284</sup> ES Diarrhoea – Water purification: p330 in summary book: There is evidence in favour of chlorination, ceramic, sand or Lifestraw® filtration and flocculation and disinfection to purify water.

- disinfect the water with chlorine drops or tablets. These can be purchased in specialist outdoor shops. This method is for emergencies if none of the other methods are possible.
- + In our country, food quality standards are strictly monitored (for products of animal or vegetable origin). However, it is still advisable to consider the following guidelines when storing and cooking food (see Food poisoning) (EB<sup>285</sup>, weak recommendation, very low quality evidence):
  - Wash your hands frequently with water and soap.
  - Use a separate chopping board for vegetables, fish and meat, and clean them thoroughly afterwards. Avoid using the same utensils for raw and cooked food.
  - Keep fish on the lowest shelf in the fridge.
  - Let frozen food thaw in the fridge.
- + If someone in your environment has diarrhoea, take the following measures:
  - avoid using the same cutlery or glass;
  - avoid contact with weak or vulnerable people;
  - don't let this person prepare the meal.
- + In less hygienic circumstances (for example, when travelling in certain countries, but also at major events, local food stalls, markets, etc.) avoid the following foods (see Food poisoning) (EB<sup>286</sup>, weak recommendation, very low quality evidence):
  - raw vegetables and cold salads;
  - uncooked or unbaked food (meat or fish) or food containing these ingredients;
  - milk products using non-pasteurised or uncooked milk;
  - food that has been standing at room temperature for a long time;
  - fruit that you cannot peel yourself;
  - tap water and ice cubes;
  - local products that do not look or smell fresh;
  - water from bottles that have been opened out of your sight;
  - food (like ice cream) from a stall.
- + Avoid swallowing any water when swimming in open water (EB<sup>287</sup>, weak recommendation, very low quality evidence).

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<sup>285</sup> ES Diarrhoea & Dehydration – Kitchen hygiene: p396 in summary book: It was shown that using a separate chopping board for raw and cooked meat resulted in a statistically significant decreased risk of diarrhoea. It was shown that frequently defrosting chicken in the microwave and not storing meat on the bottom shelf in the refrigerator resulted in a statistically significant increased risk of diarrhoea.

<sup>286</sup> ES Diarrhoea & Dehydration – food: p382 in summary book: It was shown that the following risk factors resulted in a statistically significant increased risk of *E. coli* 0157:H7 or *Salmonella* infection: eating pink ground beef, eating pink ground beef patties, eating a hamburger cooked less than usual, eating at table-service restaurant, eating pink hamburger at home, eating pink hamburger away from home and consumption of raw or undercooked ground beef. It was shown that the following risk factors resulted in a statistically significant decreased risk of *Cryptosporidium/Salmonella* infection: eating uncooked carrots and consumption of carrots. It was shown that the following risk factors resulted in a statistically significant increased risk of *Salmonella* infection: storage of eggs > 2 weeks and consumption of raw or undercooked eggs. It was shown that consumption of curd/cottage cheese resulted in a statistically significant increased risk of *Campylobacter* infection.

<sup>287</sup> ES Diarrhoea & Dehydration – drinking and swimming: p377 in summary book: It was shown that the following risk factors resulted in a statistically significant increased risk of *Cryptosporidium/Giardia* infection: exposure to any recreational water, recreational fresh water contact, and swallowed water while swimming.

## 3. Dehydration

### What do you see? (EB<sup>288</sup>, low quality evidence)

- + The person feels weak and sick.
- + He may have a headache and feel dizzy and/or nauseous.
- + The person may vomit or suffer from diarrhoea.
- + He is frequently thirsty (but note that young children or the elderly do not often admit this).
- + He urinates infrequently. The urine has a strong smell and is dark in colour (very concentrated urine).
- + He may have a dry mouth and dry mucosa (inside of mouth, tongue, inside of eyelid).
- + The skin becomes less elastic.
- + The person exhibits rapid, deep breathing and a slowed heart rate.
- + A baby may cry without emitting tears.
- + A baby may have dry nappies for a long time.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>289</sup>, strong recommendation, moderate quality evidence).
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the ill person is a baby, a young child, an elderly or sick person who shows signs of dehydration;
    - o the ill person exhibits impaired consciousness (exhaustion, difficulty awakening, confusion);
    - o he cannot keep liquids down (for example, in the event of serious vomiting);
    - o he does not urinate frequently or at all and the urine is dark in colour;
    - o he has a fever;
    - o you are in doubt.
  - + Call the emergency services on 112 in the event of severe dehydration. For example, if the ill person exhibits impaired consciousness (exhaustion, difficulty awakening, confusion).
4. Administer further first aid
  - + Let the ill person drink regular and small amounts of liquid:

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<sup>288</sup> ES Dehydration – Clinical signs/symptoms: p400 in summary book: There is limited evidence showing that at least 3 of the following clinical signs are predictive for the diagnosis of dehydration due to acute diarrhoea: decreased skin elasticity, poor overall appearance, no tears, abnormal respirations (deep and rapid), dry mucous membranes, sunken eyes, abnormal radial pulse (weak/impalpable). Additionally, 2 among the following 4 clinical signs could also be considered as predictive for the diagnosis of dehydration (due to acute diarrhoea): delayed skin recoloration time, dry mucosa, no tears, poor overall appearance.

<sup>289</sup> ES Diarrhoea – Hand washing: p323 in summary book: There is evidence in favour of hand washing.

- In less serious cases, water is sufficient. Other good options are sports drinks, tea or a weak bouillon (EB<sup>290</sup>, weak recommendation, very low quality evidence). Do not use (flat) cola (EB<sup>291</sup>, weak recommendation, very low quality evidence).
- In severe cases, give the ill person an over-the-counter rehydration solution, such as ORS (Oral Rehydration Solution). ORS is a mixture of salts and dextrose, designed to be dissolved in water. Ask a pharmacist for advice (EB<sup>292</sup>, weak recommendation, low quality evidence; EB<sup>293</sup>, weak recommendation, moderate quality evidence).
- A breastfed baby must be fed more frequently.
- A bottle-fed baby should be given the normal amount of milk, supplemented with a rehydration drink such as ORS.
- + If the ill person so desires, he may eat something. He can eat whatever he likes.
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>294</sup>, strong recommendation, moderate quality evidence).

### Preventing dehydration

- + Do not wait until you are thirsty; drink regularly. Make sure that children and the elderly drink enough.
- + Be sure to drink before and during exertion (for example, when doing sport). When doing sport for a sustained period, you can opt for a sports drink.
- + If you have a fever, drink more than usual. This applies in hot and humid weather. Drink small amounts on a regular basis.
- + Vary your drinks (water, soup, tea, fruit juice, lemonade ...).
- + Eat fruit and vegetables at regular intervals. These contain a lot of water.

## 4. Hiccups

### What do you see?

- + The ill person has the hiccups.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person

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<sup>290</sup> ILCOR FA 584: Exertion-related dehydration therapy: We suggest that first aid providers use 3% to 8% CE drinks for treating exertion-related dehydration. If 3% to 8% CE drinks are not available or not tolerated, alternative beverages for rehydration include water, 12% CE solution, coconut water, 2% milk, tea, tea-CE, or caffeinated tea beverages.

<sup>291</sup> ES Dehydration – Drinking carbonated drinks: summary book p412: There is limited evidence in favour of not drinking carbonated beverages for the outcomes urinary Na<sup>+</sup> loss, urine Ca<sup>2+</sup> loss and urine Mg<sup>2+</sup> loss, total body weight and rehydration. There is limited evidence neither in favour of drinking carbonated beverages nor drinking water for the outcomes fluid retention, total body water, extracellular or intracellular body water, total blood volume, serum osmolality, serum haemoglobin, serum haematocrit, serum Na<sup>+</sup>, Cl<sup>-</sup>, K<sup>+</sup> levels, serum urea nitrogen levels, serum creatinine levels or serum protein levels.

<sup>292</sup> ES Dehydration – Oral rehydration solution (ORS): p406 in summary book: There is limited evidence showing no difference between ORS use and IVT.

<sup>293</sup> ES Dehydration – Reduced osmolarity ORS: p409 in summary book: There is limited evidence in favour of reduced osmolarity ORS.

<sup>294</sup> ES Diarrhoea – Hand washing: p323 in summary book: There is evidence in favour of hand washing.

- + Find out what is wrong with the ill person.
- 3. Seek help from a specialist
  - + Seek help from a specialist if the hiccups create an uncomfortable situation, if it occurs frequently and is difficult to tolerate, or if it persists for a long time (a whole day).
- 4. Administer further first aid
  - + Employ one of the tricks for stopping hiccups. There are a whole variety of them. It is difficult to assess if the tricks really work, since hiccups usually stop by themselves.
    - o Some tricks are based on diverting the ill person's attention or stimulating other nerves, for example by sucking on an ice cube or sugar lump or biting on a piece of lemon.
    - o Others are based on interrupting the normal function of breathing, for example by holding your breath for a few seconds, or giving someone a fright, or closing the mouth and nose while 'blowing out' air (the Valsalva manoeuvre).
  - + Wash your hands after administering first aid (EB<sup>295</sup>, strong recommendation, moderate quality evidence).

## 5. Swallowed object

### What do you see?

- + The person has swallowed an object.
- + In some cases he may complain about pain or a strange feeling in the throat, oesophagus or stomach.
- + He may also feel nauseous.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>295</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the person has stomach pain, is vomiting or has bloody stools (something that does not immediately point to the swallowing of a foreign object);
    - o the person has a sore throat or difficulty swallowing;
    - o the swallowed object is a button battery;
    - o the swallowed object is sharp;
    - o the swallowed object may be poisonous.
  - + Call the emergency services on 112 if:
    - o the person has swallowed a large or sharp object;
    - o the person's condition is serious or deteriorates.
  - + While waiting for the general practitioner or emergency services, contact the Anti-Poison Centre on 070 245 245 if the swallowed object is potentially poisonous (for example, a cigarette butt, cosmetics, medication or fruit of a poisonous plant) (see Poisoning).

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<sup>295</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

4. Administer further first aid

- + Check to see if the person has actually swallowed the object. A child may sometimes still have the object in his mouth.
- + Try and find out what sort of object the person has swallowed (a cap, a marble ...).
- + If a small and rounded object has been swallowed, the person will not usually experience any symptoms. Check the stools for a few days afterwards (EB<sup>296</sup>, strong recommendation, moderate quality evidence). The object will usually pass through the body within 3 to 24 hours.
- + Wash your hands after administering first aid (EB<sup>297</sup>, strong recommendation, low quality evidence).

## 6. Abdominal injury

### 6.1. Internal abdominal bleeding

#### What do you see?

- + The injured person has suffered a punch or blow to the stomach.
- + The injured person's stomach may be bruised or may feel hard and tense.
- + The injured person may be suffering a lot of pain in the stomach and the knees may be drawn up.
- + He may exhibit impaired consciousness, or be unconscious. In some cases, unconsciousness is the only symptom. In that case, it is difficult to establish whether or not the injured person is suffering from internal abdominal bleeding.
- + He may show signs of shock (see Shock induced by blood loss).

#### This is what you should do!

1. Make the area safe
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing.
3. Seek help from a specialist
  - + Call the emergency services on 112 if you suspect internal abdominal bleeding, or if the injured person exhibits impaired consciousness or is unconscious.
4. Administer further first aid
  - + Do not administer painkillers, even if the injured person requests them.
  - + Do not give the injured person anything to eat or drink.
  - + Check the injured person's consciousness and breathing every minute.

### 6.2. Abdominal injury

#### What do you see?

- + The injured person has a stomach injury.

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<sup>296</sup> ES Swallowing a foreign object – Inspection faeces: p429 in summary book: There is limited evidence either in favour of watchful waiting or endoscopic removal.

<sup>297</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

- + The wound may be bleeding intensely.
- + In some cases you may see protruding bowels.
- + He may be showing signs of shock (see Shock induced by blood loss).

### This is what you should do!

1. Make the area safe
  - + Ask the injured person to put pressure on the wound himself if possible.
  - + Is the injured person sitting or standing? Help him to lie down on the ground while he continues to put pressure on the wound.
  - + Put on disposable gloves.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing.
3. Seek help from a specialist
  - + Ask someone to call the emergency services on 112. Do this yourself if you are alone. Make sure the injured person continues to put pressure on his wound with his hands. If that does not work, put pressure on the wound with your own hands and if necessary use the loudspeaker function on your mobile phone to make the call.
4. Administer further first aid
  - + Open or loosen clothing on the injured person's upper body so that you can look at the wound.
  - + Apply pressure on the wound with your own hands.
  - + Help the injured person find the most comfortable position. This is usually a lying position with the knees drawn up. This reduces tension on the abdomen.
  - + If there is a foreign object sticking out of the wound, do not remove it.
  - + Cover the wound with sterile compresses and press down firmly to staunch the bleeding and prevent the bowels protruding if the injured person coughs or pushes.
  - + If there are bowels protruding from the wound, do not attempt to push them back. Cover the bowels with compresses that have been soaked in water to prevent them drying out.
  - + Continue to apply pressure to the wound until the emergency services arrive.
  - + Take off your disposable gloves and wash your hands after administering first aid.

## 7. Side stitches

### What do you see?

- + The injured person has a stabbing pain (stitch) in his side during or after intensive exercise (for example, when doing sport or heavy manual labour).

### This is what you should do!

1. Make the area safe
2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if the side stitches persist.
4. Administer further first aid
  - + Reassure the person: the stabbing pain in the side is not harmful.
  - + Advise the person to stop the exertion and rest. This will reduce the pain.

- + Do not give the person anything to eat or drink.
- + It may help to tighten the abdominal muscles (EB<sup>298</sup>, weak recommendation, low quality evidence).
- + Advise the person to breathe calmly, exhaling slower than inhaling.

## 8. Back pain

### What do you see?

- + The person is suffering from back pain. This is sometimes accompanied by neck pain.
- + The pain may occur suddenly (acute back pain), may be continuous and long-term (chronic back pain) or become worse on top of the existing chronic back pain.
- + The pain may radiate to an arm or leg.
- + In some cases the person may experience sensory impairment or loss of strength in a limb (arm or leg). Sometimes he will not be able to move a limb.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist. Do this in particular if:
    - o symptoms of paralysis suddenly occur;
    - o the person suddenly experiences sensory impairment;
    - o he cannot hold in stools or urine (sphincter disorders).
  - + Call the emergency services on 112 if:
    - o the acute pain is intense and lasts a long time;
    - o you suspect a spinal injury (see Spinal Injury).
4. Administer further first aid
  - + Help the person find the most comfortable position. Many people suffering back pain feel better in a 90/90 position. This entails lying on the back with the upper legs at a 90 ° angle with the trunk and the knees also bent at a 90 ° angle. This position can be achieved for example by lying the legs on a chair or by putting a sturdy cardboard box in the bed with a few cushions on top of it. Have the person lie on the bed and place his legs on the box.
  - + If the back pain is the result of an accident, where there has been a serious impact to the back (for example, in a car accident or after a fall), advise the injured person to move as little as possible (see Spinal injury).
  - + Apply warmth to the back in the form of warm clothing or a heat pouch (EB<sup>299</sup>, weak recommendation, low quality evidence).

### Preventing back pain

These tips may be useful in the short term:

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<sup>298</sup> ES Side stitches – Physical manoeuvres: p435 in summary book: There is limited evidence in favour of contracted abdominal muscles, modified breathing and tightened abdominal belt.

<sup>299</sup> ES Backpain – Heat or cold application: p442 in summary book: There is limited evidence in favour of heat application. No evidence was found on cold application for backpain.

- + Adopt a good posture. Back pain is often the result of bad posture when sitting (for example, those with an office job) or sleeping. Seek help from a specialist for more information about ergonomic postures.
- + Change your posture regularly. Certain sustained movements (for example, turning to the side while bending over) or certain postures (for example, standing for a long time) increase the risk of back pain (EB<sup>300</sup>, weak recommendation, very low quality evidence). Be sure to exercise frequently.
- + Lift objects with bended knees, not a bended back. Hold a heavy object as close to your torso as possible (EB<sup>301</sup>, weak recommendation, low quality evidence).

The following tips are relevant for the longer term:

- + Make sure you have the right supervision when doing sport.
- + Take enough rest. Sleep reduces the burden on the intervertebral discs, enabling them to take up fluid again. This becomes impossible if you have insufficient rest, and the intervertebral discs will wear out more quickly.
- + Practise back and stomach exercises to strengthen your back. Consult a doctor or physiotherapist.

## 9. Genital injuries

### What do you see?

In the case of genital injuries, various symptoms may be present to a lesser or greater degree, depending on the severity of the injury.

- + The injured person has fallen or is usually lying on the ground with legs drawn up and hands over the genitals.
- + He is in a lot of pain, which is sustained and acute. The pain decreases after a while. Severe pain in a testicle can radiate to the stomach or back.
- + There may be external or internal bleeding.
- + The genitals themselves or the area around them may be swollen.
- + There may be a skin wound on or around the genitals.
- + The ill person may feel nauseous or dizzy. He may feel sick or vomit.
- + He may be pale and sweaty.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>302</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.

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<sup>300</sup> ES Back pain – Sitting/standing/walking: p452 in summary book: There is limited evidence neither for the benefit/harm of sitting a longer period compared to a shorter period or no sitting. There is limited evidence with harm for standing >30 min per hour. There is limited evidence neither for the harm/benefit of walking nor no walking. There is limited evidence with harm for standing/walking >2 hours in females.

<sup>301</sup> ES Back pain – Lift technique: p448 in summary book: There is limited evidence in favour of bending knees/straight back.

<sup>302</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

- + Check whether the injured person is conscious.
- + Open the airway and check the breathing if necessary.
- 3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the injured person has additional injuries;
    - o the injured person urinates blood or cannot urinate;
    - o he experiences persistent pain.
  - + Call the emergency services on 112 if:
    - o the injured person has a bleeding or external wound to the genitals;
    - o he has a severe and persistent pain in the testicle.
- 4. Administer further first aid
  - + Explain carefully to the injured person what you are going to do, and ask permission to touch him. If it is a child, ask permission from the parents or person accompanying them.
  - + If there is bleeding, put pressure directly on the wound. Use a clean towel or cloth or compresses.
  - + Help the injured person find the most comfortable position.
  - + Try to calm the injured person down and help him to relax. This will interrupt the pain reflexes.
  - + Advise the injured person to move as little as possible.
  - + Make sure there is privacy for the injured person.
  - + Cool the injury for a maximum 20 minutes with ice cubes in a bag of water. If this is not possible, you can use something else to cool down the wound (for example, a cool pouch). While cooling, do not bring the ice into direct contact with the skin, but wrap it first in a towel or other cloth.
  - + Stop cooling if it bothers the injured person. If the pain recurs, you can cool the wound again, as long as the skin is back to a normal temperature.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>302</sup>, strong recommendation, low quality evidence).

### Preventing genital pain

- + Respect the rules of the sport. They have been designed to ensure that the game or competition runs smoothly and safely. Non-compliance with or deliberate breach of these rules increases the risk of injury.
- + Sportsmanship is important. Do not make any deliberate mistakes, or challenges and play fair.
- + In some sports (for example, rugby or combat sports) it is recommended to wear a guard or jockstrap. This protects the genitals.

**Summaries made for topics for which no evidence could be identified:**

- ES Stomach pain – Eating/drinking citrus fruits, chocolate, onions or buttermilk: p298 in summary book
- ES Abdominal pain – Posture: p299 in summary book
- ES Vomiting – Drinking/eating (timing): p317 in summary book
- ES Vomiting – Drinking (volume): p318 in summary book
- ES Hiccups – Techniques to stop hiccups: p426 in summary book
- ES Hiccups – Pharyngeal stimulation: p428 in summary book
- ES Abdominal injury – Posture: p431 in summary book
- ES Abdominal injury – Pressure: p432 in summary book
- ES Abdominal injury (bulging organs) – Pushing back organs: p433 in summary book
- ES Side stitches – Stop physical activity: p434 in summary book
- ES Genital injury – Breathing patterns: p458 in summary book
- ES Genital injury – Cooling: p459 in summary book
- ES Genital injury – Urinate: p 460 in summary book

**Summaries for which studies have been identified but which have not resulted in a recommendation:**

- ES Menstruation (dysmenorrhea) – Massage: p310 in summary book
- ES Side stitches – Physical manoeuvres: p435 in summary book
- ES Side stitches – Drinking: p439 in summary book

# Limbs

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# 1. Bruising

## What do you see?

- + The bruised limb is painful and may be swollen.
- + The person may be unable to use the limb or only with difficulty.
- + The skin may be blue.

## This is what you should do!

1. Make the area safe
  - + Advise the person to move the affected limb as little as possible (EB<sup>303</sup>, weak recommendation, very low quality evidence)
2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the swelling is very pronounced;
    - o the limb is in an abnormal position;
    - o the limb is abnormally (im)mobile;
    - o the person experiences sensory impairment;
    - o you have any doubts about the severity of the injury.
4. Administer further first aid
  - + If the bruising is to the upper limbs, remove any rings on fingers. This is because the fingers may swell up later.
  - + Cool the painful site for a maximum of 20 minutes with ice cubes in a bag of water or a cool bag to reduce the swelling and pain. While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Use a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. If you do not have any ice, use cold water (EB<sup>304</sup>, weak recommendation, low quality evidence).
  - + Stop cooling if it bothers the injured person. If the pain recurs, you can cool the wound again, as long as the skin is back to a normal temperature.
  - + Apply a compression bandage if the injured person allows it, depending on the pain. It may provide support and reduce pain and further swelling in the area concerned (EB<sup>305</sup>, weak recommendation, very low quality evidence).

# 2. Sprain

## What do you see?

- + The injured person is experiencing pain in the sprained joint.
- + He finds it difficult to use the joint concerned.
- + At the site of the sprain, there may be swelling or bruising.

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<sup>303</sup> ES Sprains and strains – Rest: p477 in summary book: There is limited evidence in favour of mobilization (on the longer term). Experts recommend keeping the joint as stable as possible in the context of first aid.

<sup>304</sup> ES strains and sprains – Ice: p472 in summary book: There is limited evidence in favour of ice/cooling.

<sup>305</sup> ES strains and sprains – Compression: p485 in summary book: There is limited evidence in favour of no compression. Experts recommend applying a support bandage, but not for long-term use.

## This is what you should do!

1. Make the area safe
  - + Advise the injured person to move the affected limb as little as possible (EB<sup>306</sup>, weak recommendation, very low quality evidence).
    - o ask him to hold his hand or arm against his chest;
    - o do not let him lean on the foot on the side of the injury.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person. Do not test the mobility of the joint yourself. Ask the injured person not to move the joint in question.
3. Seek help from a specialist
  - + Seek help from a specialist if you suspect a sprain and the pain does not lessen after cooling, or if you are in doubt about the severity of the injury.
4. Administer further first aid
  - + If the sprain has occurred in the upper limbs, remove any rings on fingers. This is because the fingers may swell up later.
  - + If the sprain has occurred in the lower limbs, let the injured person remove his own shoe. He will know how to do it most comfortably.
  - + Cool the painful site for a maximum of 20 minutes with ice cubes in a bag of water or a cool bag to reduce the swelling and pain. While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Use a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. If you do not have any ice, use cold water (EB<sup>307</sup>, weak recommendation, low quality evidence).
  - + Stop cooling if it bothers the injured person. If the pain recurs, you can cool the wound again, as long as the skin is back to a normal temperature.
  - + Apply a compression bandage if the injured person allows it, depending on the pain. It may provide support and reduce pain and further swelling in the area concerned (EB<sup>308</sup>, weak recommendation, very low quality evidence).

## Preventing a sprain while doing sport

- + If you practise a sport in which certain joints are likely to come under serious pressure, consider wearing a compression bandage while exercising (for example, an ankle bandage, a wrist bandage or a knee bandage). This is especially useful if you have previously suffered a sprain. You can buy preformed compression bandages in a sports shop or pharmacy (EB<sup>309</sup>, weak recommendation, low quality evidence).
- + Wearing a brace may help to prevent an injury, and can provide support when you have suffered an injury. It helps to compensate for loss of function in muscles or joints. Ask your doctor for advice before using a brace.
- + If you do suffer a sprain, respect the recovery and rest period recommended by your doctor, even if you no longer feel any pain.
- + The better you can master a certain technique, the safer you will be when practising a sport. Learn the right technique for your sport from qualified trainers right from the beginning.

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<sup>306</sup> ES Sprains and strains – Rest: p477 in summary book: There is limited evidence in favour of mobilization (on the longer term). Experten bevelen aan om het gewricht zo stabiel mogelijk te houden als eerste hulp.

<sup>307</sup> ES strains and sprains – Ice: p472 in summary book: There is limited evidence in favour of ice/cooling.

<sup>308</sup> ES strains and sprains – Compression: p485 in summary book: There is limited evidence in favour of no compression. Experts recommend applying a support bandage, but not for long-term use.

<sup>309</sup> ES sprains and strains – Compression/elastic bandage: p495 in summary book: There is limited evidence in favour of elastic bandaging.

## 3. Dislocation

### What do you see?

- + The joint in question is in an abnormal position.
- + The injured person can no longer move the joint normally (for example, the arm can no longer be moved if the shoulder is dislocated).
- + The injured person is experiencing intense pain in the affected joint.
- + At the site of the dislocation, there may be swelling and bruising.
- + If the injury is an open dislocation, you will also see a wound with blood loss. Bone fragments may also be visible.

### This is what you should do!

1. Make the area safe
  - + Advise the injured person to move the affected joint as little as possible (EB<sup>310</sup>, weak recommendation, very low quality evidence).
    - o ask him to hold his hand or arm against his chest;
    - o do not let him lean on the foot on the side of the injury.
  - + Wear disposable gloves if the injury is an open dislocation (EB<sup>311</sup>, strong recommendation, low quality evidence).
  - + Move the limb as little as possible while providing first aid. Never reset a joint that is in an abnormal position.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person. Do not test the mobility of the joint yourself. Ask the injured person not to move the joint in question.
3. Seek help from a specialist
  - + Seek help from a specialist if the injured person has suffered a dislocation to the upper limbs. You may want to take the injured person to the hospital yourself. Call the emergency services on 112 if in doubt.
  - + Call the emergency services on 112 if the injured person has suffered a dislocation to his lower limbs. The care specialists have special equipment with which to transport someone who has suffered a dislocation.
4. Administer further first aid
  - + Is the injury an open dislocation?

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<sup>310</sup> ES Sprains and strains – Rest: p477 in summary book: There is limited evidence in favour of mobilization (on the longer term). Experts recommend keeping the joint as stable as possible.

<sup>311</sup> ES Wound management – wearing gloves for bleeding effects for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves.

Yes: open dislocation	No: closed dislocation
<ul style="list-style-type: none"> <li>+ Stop the (possibly serious) bleeding by applying direct pressure to the wound. When doing so, do not move the limb (EB<sup>312</sup>, weak recommendation, very low quality evidence).</li> <li>+ If the dislocation has occurred in the upper limbs, remove any rings on fingers. This is because the fingers may swell up later.</li> <li>+ Cover an open dislocation with a non-stick sterile compress, or a sterile compress that you have moistened (with water or with a watery, non-staining disinfectant if there is no water available). The compress will stay in place more easily and will not stick in the wound.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>313</sup>, strong recommendation, low quality evidence).</li> </ul>	<ul style="list-style-type: none"> <li>+ If the dislocation has occurred in the upper limbs, remove any rings on fingers. This is because the fingers may swell up later).</li> <li>+ A dislocation may be accompanied by injuries to the surrounding tissue (bruising). While waiting for specialized help, cool the injury for a maximum of 20 minutes with ice cubes in a bag of water or a cool bag to reduce the swelling and pain. While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Take a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. If you do not have any ice, use cold water (EB<sup>314</sup>, weak recommendation, low quality evidence).</li> <li>+ Stop cooling if it bothers the injured person. If the pain recurs, you can cool the wound again, as long as the skin is back to a normal temperature.</li> </ul>

## 4. Bone fracture

### 4.1. Open and closed bone fracture

#### What do you see?

- + The affected joint or limb may be in an abnormal position.
- + The injured person tells you he has heard a cracking sound.
- + If the limb is moved, you may hear the bone squeak.
- + The injured person can move the affected joint or limb only with difficulty or not at all.
- + He may experience pain at the fracture site.
- + At the site of the fracture, there may be swelling and bruising.
- + If the injury is an open fracture, you will also see a wound with blood loss. Bone fragments may also be visible.

#### This is what you should do!

1. Make the area safe

<sup>312</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence neither in favour of manual compression nor vascular closing devices.

<sup>313</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>314</sup> ES strains and sprains – Ice (First Aid): p472 in summary book: There is limited evidence in favour of ice/cooling.

- + Advise the injured person to move the affected joint or limb as little as possible (EB<sup>315</sup>, weak recommendation, very low quality evidence):
    - o ask him to hold his hand or arm against his chest;
    - o do not let him lean on the foot on the side of the injury.
  - + Wear disposable gloves if the injury is an open bone fracture (EB<sup>316</sup>, strong recommendation, low to very low quality evidence).
  - + Move the limb as little as possible while providing first aid. Never reset a joint or limb that is in an abnormal position.
2. Assess the condition of the injured person
    - + Find out what is wrong with the injured person. Do not test the mobility of the joint or limb yourself. Ask the injured person not to move the affected joint or limb.
  3. Seek help from a specialist
    - + Seek help from a specialist if the injured person has suffered a closed fracture of the upper limbs. You may want to take this injured person to the hospital yourself. Call the emergency services on 112 if in doubt.
    - + Call the emergency services on 112 if the injured person has suffered an open bone fracture to the upper limbs, or a (closed or open) bone fracture to the lower limbs. The care specialists have special equipment to transport someone who has suffered a bone fracture.
  4. Administer further first aid
    - + Has the injured person suffered an open bone fracture?

<b>Yes: open bone fracture</b>	<b>No: closed bone fracture</b>
<ul style="list-style-type: none"> <li>+ Staunch the (possibly serious) bleeding by carefully applying direct pressure to the wound (EB<sup>317</sup>, weak recommendation, very low quality evidence). Do not move the limb while doing so (EB<sup>315</sup>, weak recommendation, very low quality evidence).</li> <li>+ If the bone fracture is to the upper limbs, remove any rings on fingers. This is because the fingers may swell up later.</li> <li>+ Cover an open bone fracture with a non-sticking sterile compress, or a sterile compress that you have moistened (with water or with a watery, non-staining disinfectant if there is no water available). The compress will stay in place more easily and will not stick in the wound.</li> </ul>	<ul style="list-style-type: none"> <li>+ If the bone fracture is to the upper limbs, remove any rings on fingers. This is because the fingers may swell up later. Apply a sling over both of the injured person's shoulders if the pain allows it. This may provide support and reduce the pain.</li> <li>+ A bone fracture may be accompanied by injuries to the surrounding tissue (bruising). While waiting for specialized help, cool the injury for a maximum of 20 minutes with ice cubes in a bag of water or a cool bag to reduce the swelling and pain. While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Take a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. If you do not have any ice, use cold water (EB<sup>319</sup>, weak recommendation, low quality evidence).</li> </ul>

<sup>315</sup> ES Sprains and strains – Rest: p477 in summary book: There is limited evidence in favour of mobilization (on the longer term). Experts recommend to keep the joint as stable as possible in a first aid setting.

<sup>316</sup> ES Wound management – wearing gloves for bleeding effects for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves.

<sup>317</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence neither in favour of manual compression nor vascular closing devices.

<sup>319</sup> ES strains and sprains – Ice: p472 in summary book: There is limited evidence in favour of ice/cooling.

<ul style="list-style-type: none"> <li>+ Do not place ice on an open bone fracture.</li> <li>+ Take off your disposable gloves and wash your hands after administering first aid (EB<sup>318</sup>, strong recommendation, low quality evidence).</li> </ul>	<ul style="list-style-type: none"> <li>+ Stop cooling if it bothers the injured person. If the pain recurs, you can cool the wound again, as long as the skin is back to a normal temperature.</li> </ul>
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## 4.2. Broken hip

### What do you see?

- + The injured person is suffering from groin pain.
- + In most cases he will no longer be able to stand up or walk.
- + In some cases you will see a shortening of the limb (the leg on the side of the broken hip is shorter than on the other side).
- + There may be swelling and bruising.
- + Sometimes the foot, on the side of the fracture, may lie in an abnormal position (turned outwards).

### This is what you should do!

1. Make the area safe
  - + Let the injured person lie in the position in which you found him. Try to prevent him moving (EB<sup>320</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Call emergency services on 112. The care specialists have special equipment to transport someone who has suffered a broken hip.
4. Administer further first aid
  - + Wait for emergency help to arrive.

### Preventing a broken hip in the elderly

- + Take part in fall prevention: ensure that your environment is safe (no loose cables or rugs with curled up edges, no mats that might slide, good shoes) to reduce the risk of a fall. In elderly people, most broken hips are caused by a fall.
- + Exercise regularly. As you get older, exercise helps to maintain muscle strength, balance and reflexes (EB<sup>321</sup>, strong recommendation, moderate quality evidence).
- + Use appropriate aids (such as a Zimmer frame, night lights or an anti-slip mat in the bathroom) (EB<sup>322</sup>, weak recommendation, low quality evidence).

<sup>318</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

<sup>320</sup> ES Sprains and strains – Rest: p477 in summary book: There is limited evidence in favour of mobilization (on the longer term). Experts recommend keeping the joint as stable as possible in the context of first aid.

<sup>321</sup> ES Fractures – Interventions to prevent fractures: p526 in summary book: There is evidence in favour of exercise.

<sup>322</sup> ES Fractures – Interventions to prevent fractures: p526 in summary book: There is limited evidence in favour of environmental/assistive technology interventions.

## 4.3. Pelvic fracture

### What do you see?

- + The injured person is experiencing pain in the pelvic area that gets worse with every move.
- + In most cases he will no longer be able to stand up or walk.
- + There may be sensory impairment and tingling in the limbs.
- + One or both feet may be turned outwards.
- + The injured person cannot urinate. Sometimes there is blood in the urine, or blood loss through the urethra (in case of a tear or rupture in the urethra, so that the injured person cannot urinate, but does lose blood spontaneously via the urethra).
- + The injured person may exhibit signs of shock (see Shock induced by blood loss).

### This is what you should do!

1. Make the area safe
  - + Let the injured person lie in the position in which you found him. Try to prevent him moving (EB<sup>323</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services on 112. The care specialists have special equipment to transport someone who has suffered a broken pelvis.
4. Administer further first aid
  - + Wait for emergency help to arrive.

## 5. Muscle injury

### 5.1. Torn muscle or tendon

#### What do you see?

- + The injured person experiences a sudden, intense pain in the affected limb. The pain feels as if he has been whipped.
- + He can only move the affected limb with difficulty or not at all. Depending on the affected muscle or tendon, some movements will be impossible (in the case of a torn Achilles tendon, for example, you are no longer able to stand on your tiptoes).
- + At the site of a major muscle tear, you will sometimes be able to feel a dent.
- + The affected limb is sometimes swollen.
- + The skin may turn blue, sometimes only some time after the injury has occurred.

#### This is what you should do!

1. Make the area safe

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<sup>323</sup> ES Sprains and strains – Rest: p477 in summary book: There is limited evidence in favour of mobilisation (on the longer term). Experts recommend keeping the joint as stable as possible in the context of first aid.

- + Advise the injured person to move the affected limb as little as possible (EB<sup>324</sup>, weak recommendation, very low quality evidence).
  - o ask him to hold his hand or arm against his chest;
  - o do not let him lean on the foot on the side of the injury.
- 2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
- 3. Seek help from a specialist
  - + Seek help from a specialist if you suspect a torn muscle or tendon.
- 4. Administer further first aid
  - + Remove any rings from fingers.
  - + Cool the wound for a maximum of 20 minutes with ice cubes in a bag of water or a cool bag to reduce the swelling and pain. While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Use a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. If you do not have any ice, use cold water (EB<sup>325</sup>, weak recommendation, low quality evidence).
  - + Stop cooling if it bothers the injured person. If the pain recurs, you can cool the wound again, as long as the skin is back to a normal temperature.

## 5.2 Muscle cramp

### What do you see?

- + The muscle feels hard and is painful.
- + The injured person can only use the affected limb with difficulty.
- + There is no pronounced swelling or bruising.

### This is what you should do!

1. Make the area safe
  - + Advise the injured person to stop any exertion and rest. This will reduce the pain.
2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if the person often suffers from cramped muscles without any clear cause (for example, when doing sport).
4. Administer further first aid
  - + Stretch the muscle slowly and carefully. In the case of a muscle cramp in the calf, lift the toes up, for cramp in the back of the thigh, stretch the leg (EB<sup>326</sup>, weak recommendation, low quality evidence).
  - + It may help to massage the muscles gently. This will warm up the muscle, relax it and encourage the blood flow (EB<sup>327</sup>, weak recommendation, low to moderate quality evidence).
  - + Apply warmth to the muscle in the form of warm clothing (for example, leg warmers) or a heat pouch (EB<sup>328</sup>, weak recommendation, low quality evidence).

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<sup>324</sup> ES Sprains and strains – Rest: p477 in summary book: There is limited evidence in favour of mobilisation (on the longer term). Experts recommend keeping the joint as stable as possible in the context of first aid.

<sup>325</sup> ES strains and sprains – Ice: p472 in summary book: There is limited evidence in favour of ice/cooling.

<sup>326</sup> ES Muscle cramps – Stretching exercises: p497 in summary book: There is limited evidence in favour of performing both pre- and post-exercise stretching.

<sup>327</sup> ES Muscle cramps – Massage: p500 in summary book: There is limited evidence in favour of massage.

<sup>328</sup> ES Muscle cramps – Heat application: see appendix 3: There is limited evidence in favour of heat application.

### Preventing muscle cramp

- + If you frequently suffer from muscle cramps, avoid sleeping under a blanket that wraps tightly around your feet.
- + If you do (sport) exercises, do some stretching before and afterwards (EB<sup>329</sup>, weak recommendation, low quality evidence).

## 5.3 Compartment syndrome

### What do you see?

- + The person has sudden pain in the muscles after an injury or after serious exertion. In some cases the pain is recurring (for example, when doing sport).
- + The injured person suffers sensory impairment in the affected limb (such as tingling, pins and needles, or a numb foot).
- + The muscles feel hard and there is a loss of strength.
- + The limb may turn pale.

### This is what you should do!

1. Make the area safe
  - + Advise the injured person to stop any exertion and rest. This will reduce the pain (EB<sup>330</sup>, weak recommendation, very low quality evidence).
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the pain arose suddenly and is very intense;
    - o the muscle problems recur or get worse.
4. Administer further first aid
  - + Wait for emergency help to arrive.
  - + Do not try and massage the limb yourself.

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<sup>329</sup> ES Muscle cramps – Stretching exercises: p497 in summary book: There is limited evidence in favour of performing both pre- and post-exercise stretching.

<sup>330</sup> ES Compartment syndrome – Rest: p516 in summary book: There is limited evidence in favour of rest.

**Summaries made for topics for which no evidence could be identified:**

- Strains and sprains – Elevation: p490 in summary book
- Skin wounds – Sterile compress/wound plaster/bandage: p94 in summary book
- Broken and dislocated limbs – Sling: p522 in summary book
- Broken and dislocated limbs – Splint vs sling: p523 in summary book
- Broken and dislocated limbs: p524 in summary book
- Muscle cramps – Drinking: p512 in summary book
- Muscle cramps – Massage/heat application (after exercise in hot environment): p504 in summary book

**Summaries for which studies have been identified but which have not resulted in a recommendation:**

- Muscle cramps – Cooling-down: p509 in summary book
- Compartment syndrome – Posture: p513 in summary book

# Stings and bites

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# 1. What is it?

Animals can cause injuries in various ways. They can, for instance, bite, sting, scratch or cause irritation. In many cases the injuries are not (very) serious. Others may be accompanied by serious bruising, large skin wounds and bleeding. However, injuries caused by animals are always inherently risky. There are for example many microorganisms in the mouth and on the teeth that may enter a wound caused by a bite. These microorganisms may cause an infection if the bite wound is not properly treated.

Some animal species also produce toxins that can have serious consequences for humans. Certain people have, for instance, an allergic reaction to bee or wasp stings. In the worst-case scenario, the poison of an animal can also be fatal, for instance, from the bite of certain snakes.

# 2. Insect sting or bite

## What do you see?

- + An insect sting or bite is characterised by local swelling and redness of the skin.
- + The person has an itch on the site of the sting or bite and sometimes pain.
- + If the person has an allergy to insect poison, he may have a serious reaction to the insect sting or bite. The site of the swelling, redness, itching or pain may then deviate from the site of the sting or bite.
- + Sometimes the person may have a headache and feel dizzy. He may also feel nauseous or have diarrhoea. In the case of very severe reactions the person may experience difficulty breathing and swallowing and may even lose consciousness (see Anaphylactic shock).

## This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves.
2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o you cannot remove the sting yourself;
    - o the person has widespread redness or a painful itchy swelling, but otherwise feels all right;
    - o the person begins to feel unwell after the sting or bite (this may occur up to 24 hours afterwards);
    - o the person has suffered multiple stings or bites;
    - o there are signs of infection on the site of the sting or bite;
    - o the person is (probably) not sufficiently protected against tetanus (not vaccinated, booster vaccination too long ago, there is some doubt)).
  - + Call the emergency services on 112 if:
    - o the person shows signs of a rapidly evolving allergic reaction. The person may exhibit general reactions such as difficulty breathing and swallowing, hoarseness, feeling unwell, stomach cramps, itching and redness over the whole body or loss of consciousness (see Anaphylactic shock);
    - o the person has been stung in the mouth or throat.
4. Administer further first aid
  - + Reassure the person.

## Stings and bites

- + Remove the sting as quickly as possible if it is still in the skin (EB<sup>331</sup>, weak recommendation, low quality evidence). Do so by pushing upwards from under the sting site. Then slide over it with any available object, for instance your finger nail, a bank card or the blunt edge of a knife.
- + Never use a pair of tweezers to grasp the part of the sting protruding from the skin. Do not use your fingers either. You may inadvertently squeeze the poison sack left in the skin and enable the remaining toxins to flow into the blood stream (EB<sup>332</sup>, weak recommendation, low quality evidence).
- + Clean the wound with water. Disinfect the wound if you have no water.
- + Cool the painful site with ice cubes in a bag of water or a cool bag to reduce the swelling, itching and pain. While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Use a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. If you do not have any ice, use cold water.
- + Carefully remove any jewellery from the hand that has been stung. This will prevent restriction of the blood flow from swelling to a finger that has been stung.
- + Do not use vinegar to treat an insect sting or bite. Do not use urine either: it is a myth that urine is effective in treating insect stings or bites.
- + In the case of serious itching you can use an anti-itch cream. Consult a pharmacist for a recommendation.
- + Give the person ice to suck or cool the mouth with cold water if he has been stung in the throat. This will reduce the swelling temporarily.
- + If the person has difficulty breathing, help him find the most comfortable position. This might be sitting, half-sitting or standing. In these cases, the person often feels best sitting upright or leaning over slightly, supporting himself with the elbows and lower arms on a table. Others feel better in a half-sitting position (EB<sup>333</sup>, weak recommendation, low quality evidence).
- + A person with a known allergy to insect poison will sometimes have an adrenaline auto-injector on them. This is a pre-filled syringe containing adrenaline which he can use in the case of an acute allergic reaction. Do not prevent the person from taking his medication or injecting himself (see Anaphylactic shock).
- + If the person is in great pain, he can take a simple painkiller. Always read the patient information leaflet before doing so.
- + Ask the person if he has been vaccinated against tetanus.
- + Treat the symptoms if the person exhibits general reactions.
- + Take off your disposable gloves and wash your hands after administering first aid.

Do not use a vacuum pump when treating an insect sting or bite. This device will not give the desired result. It will not remove (all) the poison and may cause injuries to the skin when used. Never suck an insect sting or bite out yourself. It is ineffective and may cause injuries.

### Preventing insect stings or bites

- + Wherever possible use an insect screen (also known as a fly screen). This will reduce the chances of insects flying around in the house.

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<sup>331</sup> ES Bee or wasp stings – Quick removal: p532 in summary book: There is limited evidence in favour of a quick removal of the sting.

<sup>332</sup> ES Bee or wasp stings – Pinching or scraping: p530 in summary book: There is limited evidence neither in favour of scraping nor pinching. Expert opinion recommends against the use of tweezers or fingers, because this action could squeeze the remaining poison sac.

<sup>333</sup> ES Dyspnoea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

## Stings and bites

- + Pharmacies sell various insect-resistant products which you can apply to your skin. These products are available as an ointment or gel, as a stick or spray ... and help prevent insect stings or bites. Consult a pharmacist for a recommendation. Sprays containing DEET (diethyltoluamide), icaridin and para-menthane-diol are most effective (EB<sup>334</sup>, weak recommendation, low quality evidence). A safe alternative to DEET is citriodiol. Apply insect spray at the earliest one hour after applying sunscreen. Insect sprays always reduce the efficacy of sunscreen (EB<sup>335</sup>, weak recommendation, low quality evidence).
- + Do not let children apply insect-resistant products themselves. The best way is to put some of the insect repellent on your own hands and then carefully apply it to the exposed parts of the child's body and face. Avoid putting it on the hands of young children, so that they do not get the product in their mouths or rub it into their eyes.
- + There are wrist bands impregnated with insect repellent available for purchase. Only wrist bands containing DEET, DEPA or DMP are effective. Their efficacy depends on the concentration of the active substance (EB<sup>336</sup>, weak recommendation, low quality evidence).

### Preventing mosquito bites

- + Mosquitoes are attracted by light. When sitting outside at night, choose a place away from lights.
- + Special candles (containing linalool, geraniol or citronella) excrete a smell while burning, which keeps mosquitoes away. Only use these candles outside. In order to be effective, the candle must contain at least 5% of the active substance (EB<sup>337</sup>, weak recommendation, low quality evidence).
- + To avoid being bitten by mosquitos, wear clothes impregnated with an insect repellent (for example permethrin or deltamethrin). These are substances that repel and kill mosquitoes (EB<sup>338</sup>, weak recommendation, very low quality evidence). You will find these work or travel clothes in specialist shops.
- + Use a mosquito repellent. Consult a pharmacist for a recommendation.
- + Stay away from areas with stagnant water (swamp), especially in the evening and at night.
- + Wear long-sleeved tops and long trousers if there are a lot of mosquitoes around.
- + Hang a mosquito net above your bed, if possible one impregnated with an insect repellent (for example permethrin or deltamethrin) (EB<sup>339</sup>, strong recommendation, moderate quality evidence). Hang it just above the bed and tuck the edges under the mattress. Do not lie against it.

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<sup>334</sup> ES Mosquito bite – Topical oils or repellents: p542 in summary book: There is limited evidence in favour of DEET, icaridin and para-menthane-diol.

<sup>335</sup> ES Sunburn – Sunscreen + insect repellent: p149 in summary book: There is limited evidence in favour of sunscreen alone. Sunscreen combined with insect repellent resulted in a statistically significant decrease of sun protection factor.

<sup>336</sup> ES Mosquito bite – Wrist bands: p544 in summary book: There is limited evidence in favour of wristbands treated with DEET, DEPA or DMP.

<sup>337</sup> ES Mosquito bite – Oil candles: p548: There is limited evidence in favour of 5% linalool/geraniol/citronella candles.

<sup>338</sup> ES Mosquito bite – Impregnated clothing: p551 in summary book: There is limited evidence in favour of wearing impregnated clothes.

<sup>339</sup> ES Mosquito bite – Bednets: p555 in summary book: There is evidence in favour of using treated or untreated bednets.

Electronic insect repellent devices appear to be ineffective (EB<sup>340</sup>, strong recommendation, moderate quality evidence). The same applies to anti-mosquito coils (EB<sup>341</sup>, weak recommendation, low quality evidence).

### Preventing bee or wasp stings

- + Bees and wasps are attracted by sweet drinks or food and strong-smelling perfumes, hairspray or suncream. If children have eaten sweet food (such as icecream), clean their hands and face thoroughly and change their clothes if they have spilled food on them.
- + Stay calm if a bee or wasp approaches you. Do not hit out at bees or wasps; this will make them aggressive and more likely to sting you.
- + Always pour soft drinks from a can into a glass so that you can see if there is a bee or wasp in it.
- + Try and avoid places with a lot of bees or wasps (outdoor rubbish bins, flowers, overripe fruit, thick old branches or tree trunks ...). If you have to work in such areas, for example, for the purposes of cutting down trees or bushes, check to see if there is a nest before you start. Ask a beekeeper or the fire service to remove a bee swarm. It is best to have a wasp nest removed by the fire service. Always close rubbish bags or containers properly.
- + Never go close to a bee hive. Never attempt to remove a bee or wasp nest yourself!
- + Avoid walking barefoot on grass.
- + Prevent bees and wasps from being able to fly into the house: use, for example, an insect screen and/or keep doors closed.
- + If you are allergic to bee or wasp stings, make sure you always have your medication with you. Tell your friends and family how to use it and write down the allergy on a card to accompany your identity card. You should also avoid eating outside.
- + You can use a bee or wasp trap to catch bees or wasps. Fill the trap with sweet or specially designed liquid. This will attract bees and wasps. They will enter the trap via a narrow opening, and not be able to get out again.

## 3. Tick bite

### What do you see?

- + A tick bite is not painful and often goes by unnoticed or is found only by accident.
- + After a few hours, the bite may begin to itch.
- + An engorged tick is about the size of a small pea. This makes it easier to spot.
- + Ticks usually bite in the neck, armpits, behind the knee, in the groin, on the head or on the ankles. In theory, a tick bite can occur anywhere on the body.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves.

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<sup>340</sup> ES Mosquito sting - Electronic mosquito repellents: see appendix 4: There is limited evidence neither in favour of electronic mosquito repellents nor the control. Expert opinion recommends against electronic insect repellents.

<sup>341</sup> ES Mosquito bite – Mosquito coils: p557 in summary book: There is limited evidence neither in favour of a metofluthrin coil nor no coil. There is limited evidence in favour of using transfluthrin coils. Expert opinion: for a certain type of coil there was a proven effect, for another not. From a teaching perspective, it is therefore not recommended to advise the use of mosquito coils.

## Stings and bites

2. Assess the condition of the injured person
  - + Find out what is wrong with the bitten person.
3. Seek help from a specialist
  - + You do not need to consult a doctor every time you are bitten by a tick. If you have removed the tick correctly and there are no further symptoms, there will be no problem.
  - + Seek help from a specialist if:
    - o there are abnormal skin changes in the initial weeks after a tick bite has occurred (a red patch or ring). The appearance of a red patch or ring with a diameter of at least 5 cm (but usually 10 to 30 cm), which usually does not itch, is not painful, does not flake and is usually not swollen, may indicate Lyme's disease (see Lyme's disease). This patch or ring occurs in 8 out of 10 cases of infection with the disease. It evolves slowly over several weeks;
    - o you experience other pathologies, such as fever or joint pain.
4. Administer further first aid
  - + Remove the tick as quickly as possible. There are many different views regarding the removal of a tick. Above all, be careful that the tick does not get the chance to leave saliva in the skin. This is always a risk if you grab the tick by the body. The tick is then squashed and bacteria can then be squirted into the skin.
  - + Since your fingers are too thick, it is best to use a special tick removal device to remove the tick. Normal tweezers are not recommended. This is because there is more of a risk that you will break the tick. Only use tweezers if you do not have a tick removal device. There are various different kinds of tick removal devices: you can choose a gripper or a 'crowbar' model. The 'crowbar' model gives the best results (EB<sup>342</sup>, weak recommendation, very low quality evidence).
  - + Do not sedate the tick with alcohol, ether or a burning cigarette before removing it (EB<sup>343</sup>, weak recommendation, very low quality evidence). This can be dangerous and the tick may respond by injecting infected saliva and/or stomach juices into the skin.
  - + Remove the whole tick. Any residues of the mouth parts can cause persistent itching and extra infection.
  - + Take the tick by the mouthparts and as close as possible to the injured person's skin. Do not squeeze the tick's body. If you do, there is a risk that the tick will respond by injecting infected saliva and/or stomach juices into the skin.
  - + Pull the tick slowly but firmly out of the skin:
    - o with a gripper tick remover: pull the tick straight out of the skin;
    - o with a 'crowbar' tick remover: make a turning movement (EB<sup>342</sup>, weak recommendation, very low quality evidence);
    - o with a pair of tweezers: pull the tick straight out of the skin (EB<sup>344</sup>, weak recommendation, very low quality evidence).
  - + Always use a tick removal device as indicated in the user instructions.
  - + Clean the wound thoroughly with water and carefully disinfect afterwards with a non-staining disinfectant.
  - + Note the date of the bite and the location of the wound. Observe the location of the bite and note down any changes. It is important to spot changes to the skin quickly.

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<sup>342</sup> ES Tick bite – Removal with specialised devices: p567 in summary book: There is limited evidence in favour of rotating with a hook with slip (commercial O'Tom Tick) to remove a tick.

<sup>343</sup> ES Tick bite – Removal by chemical treatment or heat: p571 in summary book: There is limited evidence either in favour of using chemicals (gasoline, methylated spirit, petroleum jelly, 70% isopropyl alcohol or a hot kitchen match) nor no treatment. Expert opinion does not recommend the use of chemical substances or heat.

<sup>344</sup> ES Tick bite – Removal with forceps: p564 in summary book: There is limited evidence in favour of pulling with forceps compared to rotation with forceps to remove a tick.

- + Take off your disposable gloves and wash your hands after administering first aid.

### Preventing tick bites

The best way to avoid being infected by Lyme's disease or any other disease transmitted by ticks, is to prevent ticks falling on your body and sucking your blood. There are various measures you can take to reduce this chance:

- + Avoid crawling through low bushes in parks and woods. Ticks do not jump or fly on to their victims. They crawl to the end of shrubs and wait until a possible host comes along. When they feel the presence of a host, they stretch out their legs and fall on to the clothing or skin (animal coat) of the host. Therefore, it is best to stick to the paths when walking.
- + When possible wear clothing that covers as much of the body as possible (long sleeves, long trousers, cap or hat, closed shoes ...). Wearing dark clothes also reduces the number of tick bites. There are specially impregnated clothes (with permethrin) that are tick-repellent (EB<sup>345</sup>, weak recommendation, low quality evidence).
- + There are insect repellents that are also effective for keeping ticks at bay. Ask your pharmacist whether a certain product is effective against ticks, because many insecticides are not effective enough. Do not rely exclusively on these products. Effective insect repellents must contain one of the following products: icaridin (> 10 %), DEET (> 20 %) or EBAAP (> 10 %) (EB<sup>346</sup>, weak recommendation, moderate quality evidence). A safe alternative to DEET is citriodiol. Consult a pharmacist for a recommendation. Apply insect spray at the earliest one hour after applying sunscreen. Insect sprays always reduce the efficacy of sunscreen.
- + Check your body after walking in nature (especially your head, neck, armpits, back of knees, groin and ankles). Do not forget to check your pets as well. If you are responsible for a group of children, it is important to check all of them. Children cannot do this themselves. It is therefore important that you make arrangements (beforehand) with them or with their parents.

## 4. Scabies

### What do you see?

- + The affected person is itching all over the body, especially at night when sleeping under a warm duvet or blanket. He also has itching in specific areas such as the groin and genitals.
- + The skin is flaky and inflamed, especially in the skin folds and in warm places around the body (for example, between the fingers and toes, under the armpits, under the breasts, on the soles of the feet, on the genitals or around the navel).
- + There are scratches because of the intense itching that may become infected.

### This is what you should do!

1. Make the area safe
  - + When you treat a person with scabies, there is only a small chance of becoming infected.
  - + When you help to treat scabies (applying ointment, changing bed linen ...), wash your hands and put on disposable gloves. Wear clothes with long sleeves.
2. Assess the condition of the affected person

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<sup>345</sup> ES Tick bite – Specialised clothing: p575 in summary book: There is limited evidence in favour of permethrin impregnated trousers. There is limited evidence in favour of dark clothing.

<sup>346</sup> ES Tick bite – Insect repellent: p578 in summary book: There is limited evidence in favour of using insect repellents (icaridin and EBAAP + DEET) against ticks.

- + Find out what is wrong with the affected person.
- 3. Seek help from a specialist
- 4. Administer further first aid
  - + If scabies is to be properly and completely eradicated, all those who live and have contact with the infected person must be treated simultaneously, even if they have no symptoms.
  - + To prevent re-infection, the treatment of scabies must be accompanied by a number of hygienic measures, such as washing or drying bed linen and clothes (at least 10 minutes at 50 °C to 60 °C in the washing machine or tumble drier) and cleaning everything that has come into contact with the scab mites (carpets, mattress, sofas, ...). Objects that are difficult to wash can be aired at room temperature for 72 hours. Ask your general practitioner or pharmacist for advice (EB<sup>347</sup>, weak recommendation, low quality evidence).
  - + Take off your disposable gloves and wash your hands after administering first aid.

## 5. Lice

### What do you see?

- + Lice are often difficult to spot: they are grey-white to brown in colour and crawl away fast. If you comb wet hair with a lice comb, you can see them in the comb or on a (light-coloured) background.
- + Nits are immobile, white spots that cling to the hair. They are particularly prevalent in warm places (for example, behind the ears or in the neck area).
- + The affected person will experience itching on the scalp or in the pubic hair region.
- + You may also see scratches on the skin.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves.
2. Assess the condition of the affected person
  - + Find out what is wrong with the affected person.
3. Seek help from a specialist
  - + Seek help from a specialist if you are not able to get rid of the lice after several attempts.
4. Administer further first aid
  - + Treat the hair with a lice product. Ask your pharmacist for advice and follow the user instructions for the product carefully.
  - + Repeat the treatment after a few days and weeks. Nits can survive treatment and come back later.
  - + The wet-comb method is an alternative recommended for those who cannot use lice products (such as pregnant women or babies younger than 6 months). This method involves carefully combing through wet hair (pre-washed and treated with conditioner) with a lice comb. Continue to do this every 3 days until there are no more lice or nits in the comb.
  - + Check all members of the family and treat everyone who has lice at the same time.
  - + Clean combs and brushes for 10 minutes in boiling water.

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<sup>347</sup> ES Scabies – Personal hygiene: p583 in summary book: There is limited evidence neither in favour of personal hygiene nor no personal hygiene. Expert opinion recommends taking a number of hygienic measures in order to prevent reinfection.

- + Wash clothes, linen and soft toys at 60 °C and repeat this action after a week. You can also put them in the tumble drier for 40 minutes on a hot programme.
- + Materials that cannot go in the washing machine can be aired for 48 hours outside or kept in a sealed plastic bag for 2 weeks.
- + Do not share clothes and bed linen. This is because there are some lice species that can stick to these items.
- + Take off your disposable gloves and wash your hands after administering first aid.

## 6. Stings caused by bed mites

### What do you see?

- + Droplets of blood on the sheets or a black discoloration on the mattress may indicate a bed mite plague.
- + Stings inflicted by bed mites look like mosquito bites: small red bumps. The person affected usually has more than one bite.
- + The affected person has intense itching around the sting wounds.
- + The affected person may feel nauseous.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves.
2. Assess the condition of the affected person
  - + Find out what is wrong with the affected person.
3. Seek help from a specialist
  - + Seek help from a specialist if the affected person:
    - o has extensive redness, swelling and is suffering pain;
    - o begins to feel unwell after the sting.
  - + Call the emergency services on 112 if the affected person experiences general reactions.
4. Administer further first aid
  - + Rinse the area affected by the stings with water.
  - + Cool the painful site with ice cubes in a bag of water or a cool bag to reduce the swelling, itching and pain. While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Use a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. If you do not have any ice, use cold water.
  - + Treat according to the symptoms if the affected person exhibits general reactions.
  - + Take off your disposable gloves and wash your hands after administering first aid.

## 7. Irritation caused by the oak processionary caterpillar

### What do you see?

- + Upon contact with the skin (for most cases):
  - o the affected person suffers a painful red rash and intense itching within 8 hours and this can last up to 2 weeks;
  - o there may also be injuries in other places because the stinging hairs are easily spread by sweat or scratching.
- + Upon contact with the eyes:
  - o the affected person will suffer painful red eyes within 1 to 4 hours;
  - o the eyes itch and look red.
- + Upon inhaling the stinging hairs:
  - o the affected person will sneeze frequently;
  - o may get a sore throat and problems swallowing;
  - o may have difficulty breathing because of a cramping in the respiratory tract.
- + Upon swallowing the stinging hairs:
  - o the affected person may have a lot of saliva in the mouth;
  - o may have inflamed mouth mucosa;
  - o may sometimes vomit;
  - o may have stomachache.
- + In serious cases the affected person may feel unwell in general. He may have a fever, sweat and experience difficulty breathing because of swelling of the mouth and throat mucosa. He may eventually lose consciousness.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves. Wear clothes with long sleeves to protect yourself against the burning hairs.
2. Assess the condition of the affected person
  - + Find out what is wrong with the affected person.
3. Seek help from a specialist
  - + Always seek help from a specialist.
  - + Consult an ophthalmologist if the affected person's eyes are irritated. The eyes have to be rinsed to remove all the caterpillar hairs. This is not usually possible with straightforward rinsing. An ophthalmologist will provide suitable treatment (first administering a local anaesthetic to the eye and then carefully examining the eye for any residual hairs).
  - + Consult the Anti-Poison Centre on 070 245 245 if the affected person has swallowed caterpillar hairs.
  - + Call the emergency services on 112 if the affected person experiences general reactions.
  - + Alert the city council or the fire service so that the caterpillars can be removed.
4. Administer further first aid
  - + Try to stop the affected person from scratching or rubbing the skin.
  - + Have the affected person remove all his clothes. The clothes in question can be washed as long as possible at the highest temperature possible and then dried afterwards in the tumble drier.

- + Brush the hairs out thoroughly.
- + Rinse the skin and/or the eyes of the affected person thoroughly with water. Have the affected person take a shower and wash his hair thoroughly. Use water and soap for this. Ask the affected person to put on other clothes afterwards.
- + If possible use a plaster or household sticky tape to remove hairs from the skin. Stick the tape on the skin and remove it again with a swift movement.
- + Has the affected person swallowed the caterpillar hairs? Have him drink a large glass of water to dilute the swallowed hairs.
- + In the case of minor symptoms, the irritation will disappear spontaneously after a few days to weeks.
- + In the case of serious itching you can use an anti-itch cream. Consult a pharmacist for a recommendation.
- + Treat according to the symptoms if the affected person exhibits general reactions.
- + Take off your disposable gloves and wash your hands after administering first aid.

### Preventing irritation from oak processionary caterpillar

- + Avoid areas containing affected trees during the period from May to September. You can recognise an affected tree (oak, beech or birch) by the bark-stripped branches and the caterpillar nests with poisonous hairs and moults. Do not let children play in the immediate area of an affected tree.
- + If you cannot avoid being in the area of an affected tree, you should protect yourself by wearing gloves, long sleeves, long trousers, a cap, glasses and if possible a face mask. Even when taking all these precautionary measures, skin irritation may still occur when removing the clothing if there are poisonous hairs on it. So be careful when taking clothes off and wash them afterwards.
- + If you live in the immediate vicinity of an affected tree:
  - o do not dry washing outside during the risk period (May to September);
  - o wash vegetables from your own garden carefully;
  - o a few days before mowing the lawn, spray the grass with water, so that the poisonous hairs can sink into the ground.
- + Never try to get rid of the caterpillars yourself, for example by aiming a high pressure cleaner at them. The hairs and caterpillars can be spread in the air.

## 8. Spider bite and scorpion sting

### What do you see?

- + The site of the bite or sting is red, swollen and painful.
- + The bite or sting may also itch.
- + The person experiences tingling in the skin.
- + The person may have a fever.
- + In the case of a bite or sting by a dangerous spider or scorpion:
  - o the person may feel nauseous and may vomit;
  - o he may suffer from a headache;
  - o he may have difficulty breathing (shortness of breath, coughing, wheezing);
  - o he may suffer from cardiac arrhythmias, shock or loss of consciousness (see Anaphylactic shock).

## This is what you should do!

1. Make the area safe
  - + Be careful not to get bitten or stung yourself. Do not try and catch the spider or scorpion.
  - + Stay calm and try to ensure that the stung or bitten person also remains calm. Panic reactions increase circulation and thus spread the poison even faster.
  - + Wash your hands and put on disposal gloves.
2. Assess the condition of the stung or bitten person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if the person has intense pain or itching.
  - + Call the emergency services on 112 if the person experiences general reactions.
4. Administer further first aid
  - + Treat the sting or bite like a skin wound (see Skin wound).
  - + Cool the painful site with ice cubes in a bag of water or a cool bag to reduce the swelling, itching and pain (EB<sup>348</sup>, weak recommendation, moderate quality evidence). While cooling, do not bring the ice into direct contact with the skin, but first wrap it in a towel or other cloth. Use a thin towel (for example, a tea towel), since the cold will not penetrate a thick towel as easily. If you do not have ice, use cold water (see Insect sting or bite).
  - + In the case of serious itching you can use an anti-itch cream. Consult a pharmacist for a recommendation.
  - + Treat according to the symptoms if the stung or bitten person exhibits general reactions.
  - + Take off your disposable gloves and wash your hands after administering first aid.

## Preventing a spider bite and scorpion sting

- + Wear gloves when lifting stones or wood where dangerous spiders or scorpions might live. These are the favourite shelters for spiders and scorpions.
- + In a country where dangerous scorpions and spiders are common:
  - o it is recommended not to walk around barefoot;
  - o always shake out your shoes before putting them on.

! Never use a tourniquet to tie off the area of the bite, in an attempt to stop the spread of the poison.  
! Do not try to suck out the poison with your mouth or by using a poison pump. It is ineffective and may cause injuries.

# 9. Snake bite

## What do you see?

- + The site of the bite is painful and swollen.
- + There are two rows of teeth marks or small pointed wounds.
- + In some cases the skin may turn blue or even green and purple.
- + In case of a bite by a poisonous snake:
  - o the bitten person may feel nauseous and may vomit;
  - o he may start sweating and salivating;

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<sup>348</sup> ES Scorpion sting and spider bite – Cooling with ice or cold water: p597 in summary book: There is limited evidence neither in favour of cooling with ice or cold water nor not cooling. Expert opinion recommends cooling to reduce swelling, itching and pain.

## Stings and bites

- the bitten person will feel thirsty;
- his vision may be impaired (blurred or double vision);
- the injured person may experience convulsions;
- sometimes he may experience sensory impairment or paralysis;
- the bitten person's blood pressure may suddenly fall and he may then go into shock (see Anaphylactic shock).

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves.
  - + Be careful not to get bitten yourself. Do not try to catch the snake. Take a photo, with your phone for example. The markings of the snake may be useful for later identification.
2. Assess the condition of the bitten person
  - + Find out what is wrong with the bitten person.
  - + Check whether the bitten person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services on 112 if you are not sure what kind of snake has bitten the person, if the snake is poisonous or if you do not know whether the snake is poisonous. In the latter case, always assume a snake bite is serious.
4. Administer further first aid
  - + Help the bitten person to lie down. Advise him to stay calm and move as little as possible. This will inhibit the poison from spreading.
  - + Remove jewellery, watches or tight clothing to prevent blood flow being restricted if there is swelling, if you can do so without moving the limb too much.
  - + Keep the limb as immobile as possible. If possible, use a bandage to immobilise the limb, but be careful that the bandage does not exert too much pressure on the limb. Any manipulation of the wound can cause infection, absorption of the poison or bleeding (EB<sup>349</sup>, weak recommendation, low quality evidence).
  - + Check the bitten person's consciousness and breathing every minute. Treat according to the symptoms.
  - + Take off your disposable gloves and wash your hands after administering first aid.

Some treatments have become popular wisdom, but are in fact incorrect:

- + Never use a tourniquet to tie off the area of the bite, in an attempt to stop the spread of poison. It is an ineffective treatment and may lead to a prolonged stay in hospital (EB<sup>350</sup>, weak recommendation, very low quality evidence).
- + Do not put a pressure bandage on the site of the bite. Compression can only be used for snake bites in very exceptional situations (for example, in remote areas). Specialist training is required to learn this special technique.
- + Never carve into the wound with a knife to make it bleed better. It does not reduce the influence of the poison and only makes the wound worse.

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<sup>349</sup> ES Snakebite – Pressure immobilisation: p599 in summary book: There is limited evidence neither in favour of using an elastic bandage + splint nor no first aid treatment. There is limited evidence in favour of firm pad + nonelastic bandage and rest (with elastic bandage and splint). There is limited evidence in favour of training laypeople in application of an elastic bandage.

<sup>350</sup> ES Snakebite – Tourniquet: p605 in summary book: There is limited evidence neither in favour of tourniquet nor no tourniquet. Expert opinion attaches more importance to one study of the three showing that a tourniquet significantly prolongs a stay in hospital.

- + Do not try to suck out the poison with your mouth or by using a poison pump. It is ineffective and may cause injuries (EB<sup>351</sup>, weak recommendation, very low quality evidence).
- + Do not rinse the bite and do not apply ice (EB<sup>352</sup>, weak recommendation, very low quality evidence).

## 10. Dog bite

### What do you see?

- + On the site of the bite you will see pointed injuries in the skin, caused by the dog's fangs.
- + The skin is torn and the underlying tissues (for example, tendons or nerves) may be damaged.
- + A bite wound is usually accompanied by bruising. This causes the skin to turn blue.
- + The bitten person will be suffering a lot of a pain.
- + The bite wound may bleed (but not always).

### This is what you should do!

1. Make the area safe
  - + Have the dog taken away by the owner or by a vet. A dog may regard the treatment of the bitten person as a threat and bite again.
  - + Wash your hands and put on disposal gloves.
2. Assess the condition of the bitten person
  - + Find out what is wrong with the bitten person.
3. Seek help from a specialist
  - + Seek help from a specialist as quickly as possible if:
    - o the skin is damaged;
    - o the bite wound is serious (in the face, to the hands, involving tissue loss ...);
    - o the swelling or pain gets a lot worse;
    - o the bitten person is (probably) not sufficiently protected against tetanus (not vaccinated, booster vaccination too long ago, there is some doubt);
4. Administer further first aid
  - + If the skin is intact, treat the wound like a bruise (see Bruising).
  - + If the skin is damaged, treat the wound like a skin wound (see How to treat a skin wound?).
    - o If the wound is bleeding, staunch the bleeding first by applying pressure to the wound (EB<sup>353</sup>, weak recommendation, very low quality evidence). Apply a pressure bandage if the bleeding is severe.
    - o Rinse the bite wound as quickly as possible with plenty of water. If there is no water or not enough, disinfect the wound (see How to treat a skin wound?).
    - o Dry the area around the wound.
    - o Apply a sterile dressing to the wound.
  - + Check if the injured person has been vaccinated against tetanus and rabies (see Rabies).
  - + Take off your disposable gloves and wash your hands after administering first aid.

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<sup>351</sup> ES Snakebite – Suction: p612 in summary book: There is limited evidence neither in favour of suction nor no suction. Expert opinion recommends against sucking the poison from a bite wound.

<sup>352</sup> ES Snakebite – Cryotherapy: p608 in summary book: There is limited evidence neither in favour of cryotherapy nor no cryotherapy. Expert opinion recommends against applying ice to a bite wound.

<sup>353</sup> ES Bleeding – Direct compression: p65 in summary book: No evidence could be identified comparing manual compression versus no manual compression in case of bleeding. There is limited evidence neither in favour of manual compression nor vascular closing devices.

## Preventing a dog bite

- + Teach children how to behave around dogs (EB<sup>354</sup>, weak recommendation, low quality evidence). A number of simple tips can be very helpful:
  - o Never disturb a dog while it is eating.
  - o Never wake a dog suddenly from its sleep.
  - o Do not play wildly in the proximity of a dog.
  - o Do not run towards a dog, let the dog come to you.
  - o Do not pet a dog without the owner's permission.
- + Learn to recognise your dog's normal behaviour and body language. There are training programmes for this purpose.
  - o Never leave children alone with a dog.
  - o Leave stray dogs alone. Dogs bite because they are afraid or anxious.
  - o If you have a dog that has bitten several times, ask the advice of an expert about the measures you can take to prevent it from happening again (training, having it put down, restricting its freedom ...).
- + Keep your dog on a leash in areas where there is a rabies risk (see Rabies).
- + Risk factors for dog bites are (EB<sup>355</sup>, weak recommendation, very low quality evidence):
  - o keeping a dog indoors for long periods of time (longer than 24 hours);
  - o letting a dog sleep with you in the bedroom;
  - o locking a dog up for more than an hour;
  - o letting the dog leave the garden on its own;
  - o taking the dog into an environment with strangers;
  - o not restraining a dog when it is agitated.

# 11. Human bite

## What do you see?

- + The skin is red around the bite site.
- + Teeth marks are sometimes visible.
- + After a while, the skin turns blue.
- + If the skin is damaged, you will often see tiny wounds where the teeth have penetrated the skin.
- + A serious bite wound can bleed profusely.

## This is what you should do!

1. Make the area safe
  - + Check that the situation is under control. Treat the bitten person only if there is no risk for him or you being bitten again.

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<sup>354</sup> ES Dog bite – Educational interventions to children: p615 in summary book: There is limited evidence in favour of education on dog prevention to children.

<sup>355</sup> ES Dog bite – Risk factors: p617 in summary book: It was shown that neutering the dog, keeping the dog in house 19-24 h/day, letting the dog sleep in a family member's bedroom, locking the dog up 1-6 h/day, letting the dog leave the premises unaccompanied, letting the dog chained 1-24 h/day, allowing the dog into the presence of strangers and not removing the dog or allowing it to retreat when fearful, resulted in a statistically significant increased risk of dog bites.

- + Wash your hands and put on disposal gloves.
- 2. Assess the condition of the injured person
  - + Find out what is wrong with the bitten person.
- 3. Seek help from a specialist
  - + Seek help from a specialist as quickly as possible if:
    - o the skin is damaged;
    - o the bite wound is serious (in the face, to the hands, involving tissue loss ...);
    - o the swelling or pain gets a lot worse;
    - o the bitten person is (probably) not sufficiently protected against tetanus (not vaccinated, booster vaccination too long ago, there is some doubt);
- 4. Administer further first aid
  - + If the skin is intact, treat the wound like a bruise (see Bruising).
  - + If the skin is damaged, treat the wound like a skin wound (see How to treat a skin wound?).
    - o If the wound is bleeding, staunch the bleeding first by applying pressure to the wound. Apply a pressure bandage if the bleeding is severe.
    - o Rinse the bite wound as quickly as possible with plenty of water. If there is no water or not enough, disinfect the wound (see How to treat a skin wound?).
    - o Dry the area around the wound.
    - o Apply a sterile dressing to the wound.
  - + Check if the injured person has been vaccinated against tetanus.
  - + Take off your disposable gloves and wash your hands after administering first aid.

## 12. Cat scratch

### What do you see?

- + You see a red, thickened stripe on the skin.
- + There may be point-shaped haemorrhages.
- + In some cases the injured person may suffer fever, headache and a feeling of unwellness a few days after the scratch.
- + The injuries to the skin may be more extensive on the scratch site.
- + One or more lymph nodes may swell up. You notice a thickening under the skin, for example, in the neck or armpit.
- + In serious cases, the injured person may suffer impaired consciousness or convulsions.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the scratch was inflicted by a stray cat;
    - o the injured person becomes ill and suffers from fever a few days after the scratch;
    - o the injured person exhibits other symptoms, such as swelling of a lymph node, headache or convulsions;
    - o the injured person is (probably) not sufficiently protected against tetanus (not vaccinated, booster vaccination too long ago, there is some doubt);

4. Administer further first aid
  - + If the scratch is bleeding, staunch the bleeding first by applying pressure to the wound.
  - + Rinse the scratch wound as quickly as possible with plenty of water. If there is no water or not enough, disinfect the wound (see How to treat a skin wound?).
  - + Dry the area around the scratch wound.
  - + Apply a sterile dressing to the scratch wound.
  - + Check if the injured person has been vaccinated against tetanus.
  - + Take off your disposable gloves and wash your hands after administering first aid.

### Preventing a cat scratch

- + Teach children how to behave around cats:
  - o never disturb a cat while it is eating;
  - o never wake a cat suddenly while it is sleeping.
- + Learn to recognise the normal behaviour of a cat. Stop petting or playing with the cat, as soon as it is no longer relaxed.
- + Do not let kittens play with your hands, fingers or feet; give them toys to play with instead.
- + Leave stray cats alone. Cats scratch because they are frightened or anxious.
- + Treat the cat if it has fleas. Fleas can infect the cat with bacteria that cause cat-scratch disease.
- + Sometimes a playful young cat will be calmer once it is sterilised.

## 13. Jellyfish sting

### What do you see?

- + You see red spots and little red bumps on the skin.
- + The stung person is suffering from pain, itching and a burning sensation at the site of the jelly fish sting.
- + If the jelly fish is of a dangerous type, the stung person may:
  - o feel sick and vomit;
  - o have cramps;
  - o have difficulty breathing (shortness of breath, coughing, wheezing);
  - o suffer cardiac arrhythmias, go into shock and even lose consciousness.

### This is what you should do!

1. Make the area safe
  - + Do not touch the affected place yourself.
  - + Wash your hands and put on disposal gloves.
2. Assess the condition of the injured person
  - + Find out what is wrong with the stung person.
3. Seek help from a specialist
  - + Seek help from a specialist if your treatment does not sufficiently alleviate the suffering.
  - + Call the emergency services on 112 if the stung person also experiences general reactions.
4. Administer further first aid
  - + Do not let the stung person rub the affected site.

## Stings and bites

- + Rinse the wound as quickly as possible with seawater (salty water) (EB<sup>356</sup>, weak recommendation, low quality evidence). This will rinse away the poison and stinging cells. Avoid using tap water because this can cause the release of extra stinging cells and the discharge of poison.
- + Subsequently, submerge the affected limb in warm water (as hot as possible without burning the skin: maximum 45 °C) until the pain is alleviated (20 to 30 minutes). Heat inactivates the poison and reduces the pain (EB<sup>357</sup>, weak recommendation, low quality evidence). Always check the temperature of the water first. Make sure it is not too hot.
- + In the absence of hot water, cooling can also bring relief. Use ice cubes in a bag of water or a cool bag.
- + Remove visible tentacles with tweezers. Invisible tentacles can be removed by applying shaving foam to the site and carefully scraping with the edge of piece of cardboard or a bank card, from the toes or fingers upwards. Do not rub or scour the affected area.
- + In case of serious itching you can use an anti-itch cream. Consult a pharmacist for a recommendation.
- + Do not use vinegar. This stimulates the release of toxins in the jelly fish present in our waters. Do not use urine. Do not apply a tight bandage.
- + Treat according to your observations if the injured person exhibits general reactions.
- + Take off your disposable gloves and wash your hands after administering first aid.

### Preventing a jelly fish sting

- + If you want to swim or dive into the sea, make sure you know beforehand if there are jelly fish present, the possible prevention measures (for example, special diving suits), recommended first aid and available medical assistance.
- + Avoid swimming in the sea if there are jelly fish present.
- + There is a special lotion available that helps prevent jelly fish stings (EB<sup>358</sup>, weak recommendation, low quality evidence). Ask your pharmacist for advice on how to use it correctly.
- + If you walk over a beach where there are jelly fish, wear (closed) shoes. Do not let children play with washed-up jelly fish.
- + If you are swimming in an area where there are dangerous jelly fish, stick to the designated jelly-fish-free zone.

# 14. Irritation caused by prickly marine animals on the coast

## What do you see?

- + In the area that came into contact with the animal, the person may have:
  - o red spots;
  - o itching and pain;

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<sup>356</sup> ES Jellyfish sting – Salt water: p624 in summary book: There is limited evidence neither in favour of salt water nor no salt water. Expert opinion recommends rinsing with salt water.

<sup>357</sup> ES Jellyfish sting – Hot water: p627 in summary book: There is limited evidence in favour of heat.

<sup>358</sup> ES Jellyfish sting – Sting inhibitor lotion: p634 in summary book: There is limited evidence in favour of sting inhibitor lotion.

## Stings and bites

- a burning sensation.
- + There may sometimes be a chipped sting in the skin.
- + You may also observe general reactions in the person:
  - nausea and vomiting;
  - cramps;
  - breathing problems (shortness of breath, coughing, wheezing);
  - cardiac arrhythmias;
  - shock;
  - loss of consciousness.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves.
  - + Support the person and advise him not to touch the affected area so as not to push the sting further into the skin.
2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if you are not able to get rid of the sting.
  - + Call the emergency services on 112 if the person also experiences general reactions.
4. Administer further first aid
  - + Rinse the wound as quickly as possible with seawater (salty water). This will help rinse away the released poison and stinging cells. Avoid using tap water because this can cause the release of extra stinging cells and the discharge of poison.
  - + Submerge the affected limb in hot water for 20 minutes (as hot as possible without burning the skin: maximum 45 °C). Heat inactivates the toxins and reduces the pain (EB<sup>359</sup>, weak recommendation, low quality evidence). Always check the temperature of the water first. Make sure it is not too hot.
  - + Rinse the puncture wound with water. If there is no water or not enough, disinfect the wound (see How to treat a skin wound?).
  - + Remove the chipped sting with tweezers.
  - + Dry the area around the wound.
  - + Apply a sterile dressing to the wound.
  - + Check if the person has been vaccinated against tetanus.
  - + In the case of serious itching you can use an anti-itch cream. Consult a pharmacist for a recommendation.
  - + Do not use vinegar. Do not use urine.
  - + Treat according to your observations if the person exhibits general reactions.
  - + Take off your disposable gloves and wash your hands after administering first aid.

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<sup>359</sup> ES Marine animals – Warm water: p637 in summary book: There is limited evidence neither in favour of warm water nor no warm water. Expert opinion recommends submerging the affected body part in warm water, to inactivate the poison and reduce the pain.

**Summaries made for topics for which no evidence could be identified:**

- Insect sting – Ice: p534 in summary book
- Bee or wasp stings – Vinegar: p535 in summary book
- Itch – Itch soothing solution: p536 in summary book
- Bee or wasp stings – Suction devices: p537 in summary book
- Bee or wasp stings – Topical antihistamine: p541 in summary book
- Mosquito bite – Stagnant water: p554 in summary book
- Bee or wasp stings – Sweet odour: p561 in summary book
- Tick bites – Aloe Vera: p581 in summary book
- Tick bite – Risk factors: p582 in summary book
- Scabies – Environmental hygienic measures: p586 in summary book
- Lice bite – Pediculicide: p587 in summary book
- Lice bite – Wet comb method: p588 in summary book
- Lice – Environmental decontamination: p589 in summary book
- Bedbug bite – Cooling with ice or cold water: p590 in summary book
- Bedbug bite – Washing with water: p591 in summary book
- Oak processionary caterpillar irritation – Showering: p593 in summary book
- Oak processionary caterpillar irritation – Hot washing of clothing: p594 in summary book
- Scorpion sting and spider bite – Limb elevation: p596 in summary book
- Snakebite – Irrigation/washing: p611 in summary book
- Dog bite – Wound irrigation: p614 in summary book
- Human bite – Wound irrigation: p621 in summary book
- Cat scratch or bite – Wound irrigation: p622 in summary book
- Cat scratch or bite – Risk factors: p623 in summary book
- Jellyfish sting – Removing tentacles: p632 in summary book
- Jellyfish sting – Vinegar: p633 in summary book
- Marine animals – Sting removal: p639 in summary book
- Marine animals – Vinegar: p640 in summary book

**Summaries for which studies have been identified but which have not resulted in a recommendation:**

- Bee or wasp stings: p538 in summary book
- Bee, wasp or mosquito stings – Coloured clothing: p562 in summary book

# Poisoning

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# 1. What is it?

There are many kinds of potentially poisonous products in our environment. These products are often items that we use on a daily basis. They can occur as solids (medication, a poisonous plant, poison used for small rodents ...), in liquid form (all-purpose cleaner, products for clearing drains or cough syrup) or in gas form (exhaust fumes, chlorine fumes, butane gas or fermentation gases). You can come into contact with a poisonous product by swallowing, inhaling, injecting or touching it (whereby the poisonous product comes into contact with the skin, mucosa or eyes).

Not every product is equally poisonous. Some are not poisonous at all or only to a minor degree, but there are also products that are extremely poisonous. The degree of toxicity of a product determines how a person reacts after contact with the product: the more toxic the product, the more serious the reaction. The injured person's reaction to a toxic product depends on many factors, namely body weight (an injured person with a low body weight will usually suffer more deleterious effects with the same dose of toxin than someone who weighs more; this is primarily a disadvantage with poisoning by swallowing and skin contact), metabolism (this affects the speed with which the body can convert and eventually excrete the poisonous substance), the route of administration (swallowed, inhaled, injected or touched), the quantity of toxin consumed (the dose) and the duration of contact with the poison.

Poisoning (or intoxication) can affect the nervous system, the heart, the lungs, the stomach, the intestines, the liver and the skin. These effects can simulate the symptoms of another disorder.

If you are faced with someone who has been poisoned, you will not always know for sure if this is a case of poisoning. It can often be deduced from the circumstances in which you find the injured person. For instance, an engine running in an enclosed space, an empty medication packaging, a bottle of cleaning fluid or a syringe next to the injured person. In some cases, bystanders will be able to provide more information about what has happened.

We can also make a distinction between an accidental and intentional poisoning:

- + In case of an **accidental** situation, the person accidentally consumes a toxic product. He still needs help in this situation.
- + In an **intentional** situation, the person deliberately consumes certain substances. These are usually alcohol and/or drugs, and the person may or may not have intended to get drunk or 'high'.

Someone who has intentionally taken substances may not always need help. For example, a first aider does not by definition have to treat a person who is drunk. Nor is it the case that every drug user needs your help. Generally speaking, there should be a call for help or an acute health risk. Help is for example required if the person's consciousness is seriously impaired, in the case of convulsions, paralysis, breathing difficulties, overheating or hyperthermia, cardiac arrhythmias, chest pain, signs of shock or when the person is a danger to himself or others in the area.

A person that does not want help may become aggressive if you want to give help or if you force help on him.

When providing first aid, you should always take into account the state of the person, the toxic product and the route of administration.

As in other accident situations, safety is the priority in a case of poisoning. This is extremely important in the case of poisoning, because the dangers may not always be immediately visible. Your own safety always comes first.

If you ascertain later when checking the person's consciousness and breathing that the situation is serious or even life-threatening, you should call the emergency services immediately on 112. If the situation is not serious, it is recommended to refer the poisoned person to a doctor. Always call the Anti-Poison Centre on 070 245 245. In practical terms that means:

- + Always consult a specialist in case of a poisoning: call the Anti-Poison Centre on 070 245 245. The doctor or pharmacist at the centre can tell you over the phone whether it is advisable to go to the general practitioner.
- + If the situation is serious (for example, if the poisoned person is unconscious, if there are breathing problems or if his condition deteriorates), first call the emergency services on 112. Then call the Anti-Poison Centre on 070 245 245.

While you are waiting for the emergency services to arrive, the Anti-Poison Centre will give you information on how to treat the poisoned person as effectively as possible. The situation will often dictate when it is appropriate to contact the Anti-Poison Centre in a case of poisoning. In a serious situation, first call the emergency services and then the Anti-Poison Centre. In a less serious situation, first call the Anti-Poison Centre and ask for advice. The doctors and pharmacists at the Anti-Poison Centre can tell you how the symptoms will evolve. Unlike your general practitioner (after consultation in the clinic or after a house call), they cannot see or examine the poisoned person. Which is why the information you give over the phone is so important. On the basis of your information, the Anti-Poison Centre can advise you to contact a doctor or call 112, even if the poisoned person feels alright at that particular point in time. Some products only exhibit their effects later.

## 2. Poisoning by swallowing

### What do you see?

- + You can deduce from the circumstances that the person has swallowed a poisonous product. You see, for example, an empty medicine package, you discover the residue of a poisonous substance around the person's mouth or you notice an opened bottle of cleaning fluid in the vicinity of the person. The person is also able to tell you what happened.
- + Depending on the product, you will observe the following symptoms instantly or after a while:
  - o vomiting or nausea;
  - o stomach cramps;
  - o very large or very small pupils;
  - o burns in the mouth or throat;
  - o headache and impaired consciousness (dizziness, fainting) or unconsciousness;
  - o breathing problems: too fast (hyperventilation), too slow, shallow, restricted or even no breathing;
  - o circulation problems (for example, cardiac arrhythmias) and even cardiac arrest; signs of shock: drowsiness, confusion, dizziness, paleness, sweating, trembling, nausea and vomiting, accelerated and superficial breathing, impaired consciousness ...;
  - o strange skin colour (pale, red, blue);
  - o clammy skin, profuse sweating;
  - o uncontrolled muscle movements (convulsions).

- + The person may become undercooled because he can no longer feel the outside temperature and has therefore not taken measures to prevent hypothermia. In the event of a global suppression of brain activity, the body's temperature control mechanisms and the deliberate reactions of a person in a cold environment may be at risk. For instance, somebody who is drunk will be less likely to take shelter in a warm environment and may fall asleep outside on the ground.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on gloves that are resistant to the poisonous product, in case of contact with clothes or body parts on which there is some of the product. Do this when you remove the remains of the poisonous substance as well.
  - + Place the remaining product in a safe place if you can do so without taking risks. If not, leave it to the specialist care provider and consider moving the poisoned person.
2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the breathing if necessary.
  - + Place an unconscious person in the recovery position. Do so preferably on the left side (EB<sup>360</sup>, weak recommendation, moderate quality evidence). Lying on the left side causes the contents of the stomach to be transferred more slowly to the intestines, which results in delayed uptake of the poisons.
3. Seek help from a specialist
  - + Seek help from a specialist.
  - + Call the emergency services on 112 if there are serious symptoms (for example, loss of consciousness or breathing difficulties) or if the condition of the poisoned person deteriorates.
  - + Call the Anti-Poison Centre on 070 245 245. Do not wait until there are symptoms.
4. Administer further first aid
  - + Pay strict attention to the advice given by the Anti-Poison Centre.
  - + Take off your disposable gloves and wash your hands after administering first aid.

If you have to resuscitate somebody who has been poisoned, do not give mouth-to-mouth resuscitations. Give chest compressions only or use a pocket mask (EB<sup>361</sup>, weak recommendation, low quality evidence). If the person is situated in a small, enclosed space, move him. Do not resuscitate in a small, enclosed space. The air breathed by the poisoned person may contain poisonous substances.

### Preventing poisoning by swallowing

- + Keep dangerous products in their original packaging (including the label stating the composition of the product) and in a place that children cannot reach. Never put the residues of a product in another bottle (for example, in an empty water or soft drink bottle) (EB<sup>362</sup>, strong recommendation, moderate quality evidence).

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<sup>360</sup> ES Poisoning – Left decubitus body position: p642 in summary book: There is limited evidence in favour of the left decubitus position.

<sup>361</sup> ERC 2015 – Section 2: Adult Basic Life Support and automated external defibrillation: Manikin studies indicate that the quality of CPR is superior when a pocket mask is used compared to a bag-valve mask or simple face shield.

<sup>362</sup> ES Poisoning – Safe storage: p677 in summary book: It was shown that chemicals and medicine stored unsafely and no child-restraint lids on bathroom bottles resulted in a statistically significant increased risk of unintentional poisoning. There is evidence in favour of using child-resistant containers for paraffin.

- + Store medicines out of the reach of children. Do not, for instance, leave them lying on the kitchen table. Do not pretend they are sweets if a child does not want to take any necessary medication (if the child is ill, for example).
- + If you smoke in the house (something that is strongly discouraged), clean the ashtray regularly so that children cannot play with the cigarette butts.
- + Buy cleaning products with a child-resistant cap. To open such containers, two movements must be carried out simultaneously (pushing and turning or pulling and turning). This is difficult for children, and reduces the chance of accidental contact with the product (EB<sup>363</sup>, strong recommendation, moderate quality evidence).
- + If you have young children, remove any poisonous house plants until they are older. You can also put them out of reach. Find out how to avoid planting poisonous plants in your garden and make sure that you know the names of your plants. Teach children that they should never eat plants or berries without the advice of an adult.
- + Do not pick mushrooms from outdoors unless you are properly trained in such matters.

## 3. Poisoning by inhalation

### What do you see?

- + You can deduce from the circumstances that the person has inhaled a poisonous product. You can, for instance, smell something strange (but this is certainly not always the case), you find several unconscious people in one place, or the person is situated in an enclosed space with a heater on. The person may be able to tell you what happened.
- + Depending on the product, you can observe the following symptoms instantly or after a while:
  - o vomiting or nausea;
  - o very large or very small pupils;
  - o stinging sensation in the eyes, nose or mouth;
  - o headache and impaired consciousness (dizziness, fainting) or unconsciousness;
  - o breathing problems (irrepressible bouts of coughing, wheezing, rough voice) and even breathing cessation;
  - o circulation problems (for example, cardiac arrhythmias) and even cardiac arrest; signs of shock: drowsiness, confusion, dizziness, paleness, sweating, trembling, nausea and vomiting, accelerated and superficial breathing, impaired consciousness ...;
  - o strange skin colour (pale, red, blue);
  - o clammy skin or a burning feeling on the skin;
  - o uncontrolled muscle movements (convulsions);
  - o red mucus on the mouth due to accumulation of fluid in the lungs (pulmonary oedema).

### This is what you should do!

1. Make the area safe
  - + Open the windows and doors from outside.
  - + Do not switch any electrical devices on or off, since some gases are explosive. Avoid switching lights on or off and using the doorbell or phone. If possible, extinguish all fire and pilot flames.
  - + Prevent anyone smoking in the area.

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<sup>363</sup> ES Poisoning – Safe storage: p677 in summary book: It was shown that chemicals and medicine stored unsafely and no child-restraint lids on bathroom bottles resulted in a statistically significant increased risk of unintentional poisoning. There is evidence in favour of using child-resistant containers for paraffin.

- + Make sure that everyone stands at a safe distance and that there is nobody standing in the path of dangerous fumes.
  - + Only evacuate the poisoned person if you can do so without jeopardising your own safety.
  - + Never go into an enclosed space yourself (cellar, underground well, tank) to save an unconscious person. Leave this to the emergency services. They will have special breathing equipment and other essentials.
  - + Put on disposable gloves.
  - + Place the remaining product in a safe place if you can do so without taking risks. If not, leave it to the specialist care provider and consider moving the poisoned person.
  - + If you cannot approach the poisoned person safely, call the emergency services immediately on 112 and wait at a safe distance.
2. Assess the condition of the injured person
- + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the breathing if necessary.
  - + Place an unconscious person in the recovery position.
3. Seek help from a specialist
- + Seek help from a specialist.
  - + Call the emergency services on 112 if there are serious symptoms (for example, loss of consciousness or breathing difficulties) or if the condition of the injured person deteriorates.
  - + Call the Anti-Poison Centre on 070 245 245. Do not wait until there are symptoms.
4. Administer further first aid
- + If the poisoned person is conscious and has difficulty breathing, help him to find a comfortable position (for example, sitting, half-sitting or standing, see Breathing difficulties) (EB<sup>364</sup>, weak recommendation, very low quality evidence).
  - + Pay strict attention to the advice given by the Anti-Poison Centre.
  - + Take off your disposable gloves and wash your hands after administering first aid.

## 4. Poisoning by injection

### What do you see?

- + You can deduce from the circumstances that the person has (been) injected (with) a poisonous product. You see, for example, that there is an empty syringe or remains of the product lying nearby. Sometimes you may see that the skin is red or there are needle injuries at the injection site. The injured person is also able to tell you what happened.
- + Depending on the product, you can observe the following symptoms instantly or after a while:
  - o vomiting or nausea;
  - o stomach cramps;
  - o very large or very small pupils;
  - o impaired consciousness or unconsciousness;
  - o breathing problems (too slow, shallow, restricted) or even no breathing;
  - o circulation problems (for example, cardiac arrhythmias) and even cardiac arrest; signs of shock: drowsiness, confusion, dizziness, paleness, sweating, trembling, nausea and vomiting, accelerated and superficial breathing, impaired consciousness ...;

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<sup>364</sup> ES Dyspnoea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

- strange skin colour (pale, red, blue); clammy skin, profuse sweating; uncontrolled muscle movements (convulsions).

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves.
  - + Store the needle safely (in a needle container or for example in a closed box) so nobody else can injure themselves with it or come into contact with it (needle injury). Do not replace the needle cap because this entails the risk of a needle injury.
  - + Place the remaining product in a safe place if you can do so without taking risks. If not, leave it to the specialist care provider and consider moving the person.
2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Seek help from a specialist.
  - + Call the emergency services on 112 if there are serious symptoms (for example, loss of consciousness or breathing difficulties) or if the condition of the person deteriorates.
  - + Call the Anti-Poison Centre on 070 245 245. Do not wait until there are symptoms.
4. Administer further first aid
  - + Pay strict attention to the advice given by the Anti-Poison Centre.
  - + Take off your disposable gloves and wash your hands after administering first aid.

## 5. Poisoning by contact with chemical products

### What do you see?

- + You can deduce from the circumstances that the injured person has come into contact with a poisonous product. You see, for example, a puddle on the ground or find an opened package of chemical product in the near vicinity. The person is also able to tell you what happened.
- + Somebody who has come into direct contact with a chemical product (via skin, mucosa or eyes) may exhibit various specific symptoms:
  - He usually has an irritation or burn on the skin. The skin may be discoloured or swollen. Blisters sometimes appear or bits of skin may come loose.
  - The product may have splashed in the eyes.
- + Depending on the product, the following generalised symptoms of poisoning will occur instantly or after a while:
  - vomiting or nausea;
  - very large or very small pupils;
  - stinging sensation in the eyes, nose or mouth;
  - impaired consciousness (dizziness, fainting) or unconsciousness;
  - breathing problems (too slow, shallow, restricted) or even no breathing;
  - circulation problems (for example, cardiac arrhythmias) and even cardiac arrest;

- signs of shock: drowsiness, confusion, dizziness, paleness, sweating, trembling, nausea and vomiting, accelerated and superficial breathing, impaired consciousness ...;
- strange skin colour (pale, red, blue); clammy skin, profuse sweating, a burning feeling on the skin;
- uncontrolled muscle movements (convulsions).

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on gloves that are resistant to the poisonous product. Wear safety glasses if possible (EB<sup>365</sup>, weak recommendation, very low quality evidence).
  - + Place the remaining product in a safe place if you can do so without taking risks. If not, leave it to the specialist care provider and consider moving the person.
  - + Ventilate the room and close the packaging. This is because some products give off hazardous fumes.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Seek help from a specialist.
  - + Call the emergency services on 112 if there are serious symptoms (for example, loss of consciousness or breathing difficulties) or if the condition of the injured person deteriorates.
  - + Call the Anti-Poison Centre on 070 245 245. Do not wait until there are symptoms.
4. Administer further first aid
  - + Treat according to the symptoms (see Burns to the eye and see Chemical burns).
  - + Pay strict attention to the advice given by the Anti-Poison Centre.
  - + Take off your disposable gloves and wash your hands after administering first aid.

## 6. Specific forms of poisoning

### 6.1 Carbon monoxide poisoning

#### What do you see?

In most cases, you will only be able to conclude carbon monoxide poisoning from the circumstances in which you find the injured person.

- + The injured person has a headache, feels dizzy and may be drowsy and tired.
- + He may hyperventilate.
- + He may feel sick and vomit.
- + He may lose consciousness after a while. He may go into a coma and die.
- + In many cases his skin will turn pink, even though he has been asphyxiated.

#### This is what you should do!

1. Make the area safe

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<sup>365</sup> ES Eye injury – Eye protection: p201 in summary book. There is limited evidence in favour of safety glasses.

- + Only approach the injured person if you can do so without jeopardising your own safety. Wait for the emergency services if this is not possible. Do not take any risks!
  - o First open doors and if possible the windows from the outside.
  - o Turn off the suspected source of CO (for example, a gas boiler in the bathroom).
  - o Evacuate the poisoned person to a safe place.
- + Put on disposable gloves.
- 2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the breathing if necessary.
    - o Is the person unconscious and breathing normally? Put him in the recovery position (EB<sup>366</sup>, weak recommendation, very low quality evidence).
    - o Is the poisoned person unconscious and breathing abnormally? Resuscitate.
- 3. Seek help from a specialist
  - + Call the emergency services on 112. Do so even if the poisoned person is conscious.
- 4. Administer further first aid
  - + Is the person conscious? Help him to assume a comfortable position (for example, sitting, half-sitting or standing). Injured people who are short of breath often feel best if they sit leaning forward with their elbows on the table (EB<sup>367</sup>, weak recommendation, very low quality evidence). Ensure that the person can breathe freely. Loosen tight clothing if necessary.
  - + Check the person's consciousness and breathing regularly.
  - + Take off your disposable gloves and wash your hands after administering first aid.

## Preventing CO poisoning

- + Only use safe heating appliances. Have these appliances installed and regularly serviced by a professional.
- + Do not use any flame-operated heating appliances without connecting them up to a chimney.
- + Make sure there is sufficient ventilation in the residence. If there is a gas boiler in the bathroom, make sure there is ventilation (for example, a ventilation grid in the door or open the window a little).
- + Make sure the chimney is functioning properly. Have it regularly serviced by a professional.
- + In the case of natural gas, when the appliance is burning normally, the flame is blue. You are in danger if the flame is bigger than normal or has a yellow-orange colour. In this case, it is recommended to seek help from a professional.
- + Never leave the engine of a car running in an enclosed space (for example, in a garage). That applies to other internal combustion engines too.

## 6.2 Poisoning by drugs

### What do you see?

- + You can deduce from the circumstances that the injured person has used drugs. You can, for example, see an empty syringe, powder residue or packaging.
- + The person may have a headache, faint and be dizzy.

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<sup>366</sup> ILCOR FA 517: Recovery position: We suggest that first aid providers position individuals who are unresponsive and breathing normally into a lateral, sidelying recovery (lateral recumbent) position as opposed to leaving them supine.

<sup>367</sup> ES Dyspnoea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

- + He may have impaired consciousness and lose consciousness.
- + The person may be short of breath or may hyperventilate.
- + He may experience an epileptic attack. That is the consequence of taking certain types of drugs, but can also occur as a withdrawal symptom.
- + The person may have stomachache, feel sick and vomit.
- + The injured person may grind his teeth or make chewing motions.
- + He usually has large pupils: his pupils are dilated (mydriasis). In some cases the injured person has small pupils (miosis).
- + The person may have problems focussing: the eyes exhibit spastic muscle movements, and move in all directions.
- + He may hallucinate or have delusions, or exhibit behavioural or mood disorders (for example, sexual hyperactivity or abnormal infatuation).
- + His body temperature may rise with sweating, exhaustion, a red face and dehydration as a consequence.
- + There may be a cessation of breathing and cardiac arrest, which can result in the death of the person.

### This is what you should do!

1. Make the area safe
  - + Only approach the person if you can do so without jeopardising your own safety. Wait for the emergency services if this is not possible. Do not take any risks: the person may have a distorted sense of reality and can respond aggressively.
  - + Put on disposable gloves.
2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services on 112.
  - + Give any products or packaging that you have found on the person to the specialist care providers.
4. Administer further first aid
  - + Administer first aid depending on the person's complaints (see Overdose; Exhaustion, overheating and dehydration; Tripping and flipping ('bad trip')).
  - + Not every drug user needs help.
  - + If there is still a needle in the person's arm, remove it carefully and apply pressure to the injection site with a compress. Be careful not to prick yourself! Store the needle safely (in a needle container or for example in a closed box) so that nobody else can injure themselves with it or come into contact with it (needle injury). Do not replace the needle cap because this entails the risk of a needle injury.
  - + If there is still a tourniquet tied around a limb, loosen it carefully. This will prevent possible disastrous consequences related to the sustained presence of a tourniquet.
  - + Take off your disposable gloves and wash your hands after administering first aid.

## 6.2.1 Overdose

### What do you see?

- + You can deduce from the circumstances that the person has used drugs. You can, for example, see an empty syringe, powder residue or packaging.

- + The person may exhibit impaired consciousness. This may be the result of a brain haemorrhage (see Stroke). He may lose consciousness.
- + He may show signs of heart attack (see Heart attack).
- + He may suffer from delusions or psychoses.
- + He may exhibit behavioural changes (for example, aggression).
- + There may be a cessation of breathing and cardiac arrest, which can result in the death of the person.
- + The person may have a seizure.

### This is what you should do!

1. Make the area safe
  - + Only approach the person if you can do so without jeopardising your own safety. Wait for the emergency services if this is not possible. Do not take any risks: the person may have a distorted sense of reality and can respond aggressively.
  - + Put on disposable gloves.
2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the breathing if necessary.
    - o Is the person unconscious and breathing normally? Place him in the recovery position, preferably on the left side.
    - o Is the person unconscious and breathing abnormally? Resuscitate.
3. Seek help from a specialist
  - + Call the emergency services on 112.
  - + Give any products or packaging that you have found on the person to the specialist care providers.
4. Administer further first aid
  - + Is the person conscious? Keep him calm and do not let him walk around. Use his name and talk about real things in your immediate environment. Try to fetch a friend or family member, someone who knows the person well. Let him talk to the person.
  - + If there is still a needle in the person's arm, remove it carefully and apply pressure to the injection site with a compress. Be careful not to prick yourself! Store the needle safely (in a needle container or for example in a closed box) so that nobody else can injure themselves with it or come into contact with it (needle injury). Do not replace the needle cap because this entails the risk of a needle injury.
  - + If there is still a tourniquet tied around a limb, loosen it carefully. This will prevent possible disastrous consequences related to the sustained presence of a tourniquet.
  - + Check the person's consciousness and breathing regularly.
  - + Resuscitate the person if he stops breathing.
  - + Take off your disposable gloves and wash your hands after administering first aid.

## 6.2.2 Exhaustion, overheating and dehydration

### What do you see?

- + You can deduce from the circumstances that the injured person has used drugs. You can, for example, see an empty syringe, powder residue or packaging.
- + The injured person may be exhausted.

- + He may show signs of overheating (see Heat and sun stroke) (EB<sup>368</sup>, very low quality evidence).
- + He may exhibit behavioural changes (for example, aggression).
- + He may be dehydrated (see Dehydration).

### This is what you should do!

1. Make the area safe
  - + Only approach the person if you can do so without jeopardising your own safety. If you cannot approach the person safely, wait for the arrival of the emergency services.
  - + Do not take any risks: speed and cocaine users are often very nervous or even aggressive.
  - + Put on disposable gloves.
2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services on 112.
  - + Give any products or packaging that you have found on the injured person to the specialist care providers.
4. Administer further first aid
  - + Keep the injured person calm. Take him to a cool, quiet, peaceful place.
  - + Use his name and talk about real things in your immediate environment.
  - + Try to fetch a friend or family member, someone who knows the person well. Let him talk to the person.
  - + Try to cool him down or let him do this himself. Do this by, for example, submerging his hands and feet in cold water (see Heat and sun stroke) (EB<sup>369</sup>, weak recommendation, low quality evidence)
  - + Is the injured person wide awake? If so, give him something cool to drink (for example, a sports drink, water or cold tea) (EB<sup>370</sup>, weak recommendation, very low quality evidence). This is an exception to principle 4 of first aid.
  - + Take off your disposable gloves and wash your hands after administering first aid.

## 6.2.3 Tripping and flipping ('bad trip')

### What do you see?

- + You can deduce from the circumstances that the person has used drugs. You can, for example, see an empty syringe, powder residue or packaging.
- + The person may be having hallucinations or delusions.
- + He feels agitated and panics.
- + The person may hyperventilate.
- + He may suffer palpitations.
- + He may feel suicidal.

### This is what you should do!

1. Make the area safe

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<sup>368</sup> ES Heat stroke – Drugs or alcohol: p694 in summary book: There is limited evidence with harm for alcohol and drug use.

<sup>369</sup> ES Heat stroke – cooling: p722 in summary book: There is limited evidence in favour of cooling.

<sup>370</sup> ES Heat stroke – drinking: p728 in summary book: There is limited evidence in favour of taking extra liquids.

- + Only approach the person if you can do so without jeopardising your own safety. If you cannot approach the person safely, wait for the arrival of the emergency services. Do not take any risks: the person may have a distorted sense of reality and can respond aggressively.
  - + Put on disposable gloves.
2. Assess the condition of the injured person
    - + Find out what is wrong with the person.
    - + Check whether the person is conscious.
    - + Open the airway and check the breathing if necessary.
  3. Seek help from a specialist
    - + Call the emergency services on 112.
    - + Give any products or packaging that you have found on the person to the specialist care providers.
  4. Administer further first aid
    - + Keep the person calm. Take him to a quiet, peaceful place.
    - + Use the person's name and talk about real things in your immediate environment.
    - + Try to fetch a friend or family member, someone who knows the person well. Let him talk to the person.
    - + Do not let someone who is hyperventilating after taking drugs breathe into a bag. The fast breathing may be the result of a heart attack in the case of cocaine or speed use. It is dangerous to let such a person breathe into a bag.
    - + Take off your disposable gloves and wash your hands after administering first aid.

## 6.3 Poisoning by alcohol

### What do you see?

After excessive alcohol consumption:

- + The person may exhibit behavioural changes: he may feel excessively happy, may feel depressed, may exhibit inappropriate sexual or aggressive behaviour or make errors in judgement. He is usually unaware of this.
- + He may slur his words or speak incomprehensibly.
- + His movements may be uncoordinated and his reflexes impaired. This may exhibit in unsteady, swaying walking.
- + He may have vision problems (double or blurred vision).
- + Even though he feels warm, there is a serious risk of hypothermia in someone who is drunk (EB<sup>371</sup>, weak recommendation, low quality evidence). This is believed to be the result of blood vessels dilating and therefore emitting heat from the body more rapidly (see Hypothermia). However, there is no real clarity about the exact mechanism underlying alcohol and hypothermia.
- + The person may experience impaired consciousness: attention or memory disorders, dizziness, sleepiness and even unconsciousness.
- + The drunk person usually feels sick and may vomit.

In the case of alcohol overdose:

- + The person is unconscious. This entails a risk of choking if the person vomits.

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<sup>371</sup> ES Hypothermia – Alcohol intoxication: p696 in summary book: There is limited evidence in favour of not drinking alcohol in case of hypothermia.

- + An overdose of alcohol causes a depression of the respiratory centre. This slows down the breathing and may over time result in a cessation in breathing or cardiac arrest. These can lead to the death of the person.

### This is what you should do!

1. Make the area safe
  - + If the person is obviously drunk, only approach him if you can do so without jeopardising your own safety. Try to discourage him from driving or operating machinery. Wait for the emergency services if this is not possible. Do not take any risks: the person may respond aggressively.
  - + Try to prevent the person from cooling down (see Hypothermia).
  - + Put on disposable gloves.
2. Assess the condition of the person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious.
  - + Open the airway and check the person's breathing if necessary.
    - o Is the person unconscious and breathing normally? Place him in the recovery position, preferably on the left side. Lying on the left side causes the contents of the stomach to be transferred more slowly to the intestines, which results in delayed uptake of the poisons (EB<sup>372</sup>, strong recommendation, moderate quality evidence).
    - o Is the person unconscious and breathing abnormally? Resuscitate.
  - + Observe the person and ask bystanders what happened. This will help you to exclude or confirm drunkenness.
3. Seek help from a specialist
  - + Call the emergency services on 112 if the person is unconscious, if he is aggressive or if you are in doubt.
4. Administer further first aid
  - + Check the person's consciousness and breathing regularly.
  - + Resuscitate the person if he stops breathing.
  - + Take off your disposable gloves and wash your hands after administering first aid.

## 6.4 Food poisoning

### What do you see?

- + You can deduce from the circumstances that this is a case of food poisoning.
- + The ill person often feels sick and vomits.
- + He may have stomach cramps together with diarrhoea.
- + The ill person may have a headache.
- + In some cases he may have a fever.

### This is what you should do!

1. Make the area safe
  - + Ensure that the ill person eats no more of the spoiled food.
  - + Put on disposable gloves.
2. Assess the condition of the ill person

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<sup>372</sup> ES Poisoning – Left decubitus body position: p642 in summary book: There is limited evidence in favour of the left decubitus position.

- + Find out what is wrong with the ill person.
- 3. Seek help from a specialist
  - + Seek help from a specialist if the situation is serious (for example, the ill person has a high fever, bloody diarrhoea, mucus in the diarrhoea or dehydration symptoms), if it is a baby or elderly person, if the situation does not improve after a night's sleep or if you are in doubt.
- 4. Administer further first aid
  - + Advise the ill person to drink plenty. This will help prevent dehydration (see Dehydration).
  - + Administer first aid according to the symptoms of the ill person (see Vomiting and diarrhoea).
  - + Take off your disposable gloves and wash your hands after administering first aid.

## Preventing food poisoning

- + In our country, food quality is strictly monitored (for animal or vegetable products). However, it is still advisable to consider a number of guidelines when storing and cooking food:
  - o Keep perishable foods (such as meat, fish or dairy) at cold temperatures (fridge at maximum 4 °C, freezer at -18 °C or lower).
  - o Let frozen food thaw in the fridge (EB<sup>373</sup>, weak recommendation, very low quality evidence).
  - o Wash your hands with water and soap before preparing food (EB<sup>374</sup>, strong recommendation, moderate quality evidence).
  - o Heat meat, fish and eggs thoroughly when preparing (baking, cooking, steaming). If you want to eat them raw or rare, make sure you buy fresh and high-quality food (EB<sup>375</sup>, weak recommendation, very low quality evidence).
  - o Avoid milk products made with unpasteurised milk if you are in a high-risk group (children, pregnant women, the elderly, the sick) or only buy them if you are sure of their freshness and quality. You can check the composition of dairy products on the label. Products prepared with milk that has not been heat treated are labelled as made 'with raw milk'. Other products are described as 'UHT' (Ultra High Temperature).
  - o Avoid any contact between raw and cooked foods (do not, for example, cut raw chicken and then vegetables on the same chopping board without first cleaning the board. The vegetable may be contaminated with germs in the chicken) (EB<sup>376</sup>, weak recommendation, very low quality evidence).
  - o Avoid letting prepared food stand at room temperature for long periods of time.
  - o Always keep leftovers in the fridge and only for a short time.
  - o Observe the expiry date of products.
- + In less hygienic circumstances, avoid the following foods:
  - o raw vegetables and cold salads;
  - o uncooked or unbaked food (meat, fish, eggs) or food containing these ingredients;
  - o milk products using non-pasteurised or uncooked milk;
  - o food that has been standing at room temperature for a long time;
  - o fruit that you cannot peel yourself;

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<sup>373</sup> ES Diarrhoea & dehydration – Kitchen hygiene: p396 in summary book: It was shown that defrosting chicken in the microwave resulted in a statistically significant increased risk of diarrhoea.

<sup>374</sup> ES Diarrhoea – Hand washing: p323 in summary book: There is evidence in favour of hand washing.

<sup>375</sup> ES Diarrhoea & dehydration – food: p382 in summary book: It was shown that eating pink ground beef, eating pink hamburger, eating raw or undercooked ground beef resulted in a statistically significant increased risk of *E. coli* O157:H7 or *Salmonella* infection.

<sup>376</sup> ES Diarrhoea & dehydration – Kitchen hygiene: p396 in summary book: It was shown that using separate chopping board for raw and cooked food and using a separate chopping board for raw and cooked meat resulted in a statistically significant decreased risk of diarrhoea.

- ice cream from street vendors;
- tap water and ice cubes (ES<sup>377</sup>, weak recommendation, very low quality evidence);
- products that do not look or smell fresh;
- water from bottles that have been opened out of your sight;
- meals from stalls.

## 7. Anti-Poison Centre

### Summaries made for topics for which no evidence could be identified:

- Poisoning – Drinking milk: p649 in summary book
- Intravenous drug use – Removing a needle: p681 in summary book
- Intravenous drug use – Removing a tourniquet: p682 in summary book
- Poisoning (bad trip) – Cool environment: p690 in summary book

### Summaries for which studies have been identified but which have not resulted in a recommendation:

- Poisoning – Activated charcoal: p644 in summary book
- Poisoning – Drinking water: p649 in summary book
- Poisoning – Inducing vomiting: p661 in summary book
- Poisoning – Drinking coffee: p683 in summary book
- Poisoning – CO detector: p691 in summary book

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<sup>377</sup> ES Diarrhoea & Dehydration – drinking and swimming: p377 in summary book: There is conflicting evidence concerning drinking tap water. Expert opinion: Do not use tap water in poor hygienic circumstances.

# Specific injuries and disorders

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# 1. Diabetes

## What do you see?

- + Someone suffering hypoglycaemia will exhibit sudden impaired consciousness: ranging from dizziness, fainting, sometimes nervousness and deviant behaviour (mood swings, aggression, confusion, loss of concentration, signs that look like drunkenness) to loss of consciousness. Taking the symptoms of the ill person as a starting point, hypoglycaemia can sometimes look like a stroke (see Stroke).
  - o The ill person may have a headache and blurred or double vision;
  - o his skin may look pale;
  - o sometimes he will sweat profusely;
  - o the ill person may get sudden hunger pangs;
  - o he may tremble.
- + The symptoms of hyperglycaemia occur gradually, sometimes after hours or even days.
  - o The ill person drinks and urinates a lot and has a dry mouth;
  - o he has no appetite and sometimes vomits;
  - o in some cases the ill person will hyperventilate. This may induce tingling;
  - o in serious cases, he may lose consciousness.

## This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
  - + Check whether the ill person is conscious.
  - + Open the airway and check the ill person's breathing if necessary.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the symptoms occur more frequently than usual;
    - o the ill person does not feel or no longer feels the hypoglycaemia coming on;
    - o the ill person has a fever.
  - + Call the emergency services on 112 if:
    - o the ill person is or becomes unconscious;
    - o the condition of the ill person does not improve after first aid.
4. Administer further first aid
  - + If the ill person exhibits signs of impaired consciousness, try and find out if he has diabetes.
  - + You can give sugar to a diabetic who feels faint but is wide awake (EB <sup>378</sup>, strong recommendation, low to very low quality evidence)
    - o First give him something that contains fast-acting sugars, such as a can of soft drink or some dextrose tablets (15-20 gram). Repeat this if the symptoms are still present after 15 minutes.
    - o If the ill person feels better after taking the sugar, give him a light snack (slow-acting sugars), such as a sandwich or a waffle.
  - + If possible, let the ill person or someone close (e.g. a relative) measure his blood sugar levels.

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<sup>378</sup> ILCOR FA 795: Hypoglycemia treatment: We recommend that first aid providers administer glucose tablets for treatment of symptomatic hypoglycemia in conscious. We suggest that if glucose tablets are not available, various forms of dietary sugars such as Skittles, Mentos, sugar cubes, jelly beans, or orange juice can be used to treat symptomatic hypoglycemia in conscious individuals.

- + Let someone with hyperglycaemia take his medication if he wants to. Ask him to respect the dose. Never give medication yourself.

## 2. Travel illnesses

### 2.1 What is it?

Many people love to travel. It can be relaxing, and exciting to discover new places around the world ... Of course, when you are travelling you may suffer injuries or illnesses that are described elsewhere in this book: sunburn, food poisoning ... But there are also illnesses that are specifically related to travelling:

- + On the way to your holiday destination you may suffer from travel sickness.
- + Sitting still for too long on a bus or aeroplane can cause blood clots to form in your legs. This can also happen when you travel by car or train.
- + Traveller's diarrhoea can disrupt your holiday.
- + Climbers going into the mountains can be afflicted by altitude sickness.

Depending on your mode of transport, holiday destination and accommodation, there can be risks associated with travelling. It is therefore a good idea to find out all you can about the risks and suitable measures to take. For example, it is useful to take a first aid box with you, adapted to the risks you may encounter during your holiday. For some destinations, for example, vaccinations are recommended. Consult a specialist for this purpose.

For more information, consult the Belgian Institute for Tropical Diseases (ITG) on [www.reisgeneeskunde.be](http://www.reisgeneeskunde.be).

### 2.2 Altitude sickness

#### What do you see?

- + The ill person has a headache.
- + He may be dizzy and confused.
- + He feels tired.
- + The ill person may be short of breath.
- + He may suffer heart palpitations.
- + In some cases the ill person feels nauseous and vomits.
- + In serious cases the ill person may show signs of brain damage or pulmonary oedema (see Head injury and see Pulmonary Oedema).

#### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
3. Seek help from a specialist
  - + Seek help from a specialist if descending does not help.
4. Administer further first aid

- + Take the ill person to a lower altitude as quickly as possible. Descending will rapidly cure altitude sickness (EB<sup>379</sup>, weak recommendation, low quality evidence). Sometimes a descent of 500 metres is enough to reduce symptoms. Let the ill person rest at a lower altitude.
- + Protect the ill person against hypothermia or hyperthermia. Cover him to keep him warm if necessary (see Problems in heat and cold) or try to cool him down by for example submerging his hands and feet in cold water (see Heat and sun stroke).
- + Administer first aid according to the symptoms of the ill person (see Vomiting and diarrhoea).

### Preventing altitude sickness

- + Never climb to a high altitude too fast (EB<sup>380</sup>, weak recommendation, low quality evidence). Stay for a few days at an intermediate altitude first (between 1,500 and 2,500 metres) and make sure your itinerary includes sufficient rest days.
- + Do not take sleeping tablets during your period of stay.
- + Drink enough non-alcoholic drinks during your climb (more than you would normally drink), even if you are not thirsty (EB<sup>381, 382</sup>, weak recommendation, very low quality evidence).
- + If you do however suffer mild symptoms while climbing, stop immediately and descend to a lower altitude.
- + Access to medical care is usually limited on the mountain. It is therefore necessary to plan your excursion to high altitudes very carefully. Ask for expert advice.
- + Consult a doctor if you have previously experienced altitude sickness and are planning another high altitude excursion or climb. There is preventive medication on the market.

## 2.3 Travel sickness

### What do you see?

- + The ill person feels nauseous and may feel like vomiting or actually vomit.
- + He may feel dizzy.
- + The ill person may have a headache.
- + He turns pale.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
3. Seek help from a specialist
4. Administer further first aid

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<sup>379</sup> ES Altitude sickness – Descending: p760 in summary book: There is limited evidence in favour of descending 2250 m.

<sup>380</sup> ES Altitude sickness – Ascending slowly: p765 in summary book: There is limited evidence in favour of a slow ascent.

<sup>381</sup> ES Altitude sickness – Drinking: p769 in summary book: There is limited evidence neither for the benefit nor harm of drinking adequate amounts of fluids or for not drinking adequate amounts of fluids. The expert panel recommends drinking adequate amounts.

<sup>382</sup> ES Altitude sickness – Alcohol: p771 in summary book: There is limited evidence neither for the benefit nor harm of drinking >150g alcohol/week or drinking ≤150 g alcohol/week. Expert panel recommends against drinking alcohol.

- + Stop the movement of the means of transport if possible, for example by ending the journey and parking the car. Let the ill person get out for a moment. The symptoms will usually disappear quite quickly.
- + If you cannot stop the movement (for example, on a boat), let the ill person look straight ahead outside to a fixed point on the horizon (EB<sup>383</sup>, weak recommendation, very low quality evidence).
- + Open the window if possible, to let some fresh air in. In the case of sea sickness, advise the ill person to go outside if possible.
- + Encourage the ill person to breathe slowly and regularly (EB<sup>384</sup>, weak recommendation, low quality evidence).
- + Try to distract him, for example by having him listen to some music (EB<sup>385</sup>, weak recommendation, low quality evidence).
- + Administer first aid according to the symptoms of the ill person (see Vomiting and diarrhoea).

### Preventing travel sickness

- + Eat a light meal before departing. Avoid travelling on an empty stomach. Do not eat a heavy meal (EB<sup>386</sup>, weak recommendation, low quality evidence).
- + Drink something (non-alcoholic) before departing. Take something to drink with you for the journey (EB<sup>387</sup>, weak recommendation, low quality evidence).
- + Look straight ahead out of the window, to a fixed point on the horizon or in the distance. Try to focus on that object while travelling if you frequently suffer from travel sickness (EB<sup>383</sup>, weak recommendation, low quality evidence).
- + Listen to music while travelling (EB<sup>385</sup>, weak recommendation, low quality evidence). Distractions can help you to suffer less from travel sickness. However, do not read while travelling. Do not watch television or look at a computer screen either.
- + Focus on your breathing while travelling, if you suffer from travel sickness (EB<sup>384</sup>, weak recommendation, low quality evidence).
- + If you are travelling by car, drive the car yourself if possible. Drivers rarely suffer from travel sickness. If it is not possible to drive yourself, try and sit in the front seat. Make sure you have sufficient head support. When you travel by bus, it can also help to sit at the front. This will enable you to look straight ahead and focus on a fixed point in the distance. (EB<sup>388</sup>, weak recommendation, very low quality evidence)
- + If you travel by bus, tram, metro or train, sit in the direction of travel.
- + If you travel by boat, try and sit on deck (in the fresh air). If you can, choose a place in the middle of the boat where there are fewer fluctuations.

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<sup>383</sup> ES Travel illness – Seating position: p778 in summary book: There is limited evidence in favour of outside viewing, restricted visual field and fixation to a central point.

<sup>384</sup> ES Motion sickness – Travel activities: p774 in summary book: There is limited evidence in favour of controlled breathing.

<sup>385</sup> ES Motion sickness – Travel activities: p774 in summary book: There is limited evidence in favour of listening to music.

<sup>386</sup> ES Motion sickness – Eating or drinking: p788 in summary book: There is limited evidence in favour of eating before travelling.

<sup>387</sup> ES Motion sickness – Eating or drinking: p788 in summary book: There is limited evidence either in favour of drinking water or milk or drinking nothing.

<sup>388</sup> ES Travel illness – Seating position: p778 in summary book: There is limited evidence in favour of outside viewing, restricted visual field and fixation to a central point. There is limited evidence in favour of a high backrest. There is limited evidence either in favour of sitting in the central rear seat or sitting behind the driver. There is limited evidence in favour of self-driving.

- + You can take medication for travel sickness. You should take an effective medicine some time before you depart. Some medications for travel sickness can make you sleepy or less alert. In this case, let someone else drive. Taking medication for travel sickness can, once you feel the symptoms, still bring relief. Consult a doctor or pharmacist for a recommendation.
- + Ginger can have a positive effect on travel sickness. The use of ginger can help reduce feelings of nausea. You can, for example, chew on some ginger root, eat ginger biscuits or drink ginger tea (EB<sup>389</sup>, weak recommendation, low quality evidence).

## 2.4 Traveller's diarrhoea

### What do you see?

- + The ill person has liquid, watery, thin stools several times a day.
- + He has a frequent urge to defecate and sometimes has difficulty controlling this urge.
- + Diarrhoea is often accompanied by stomach cramps.
- + He may have a fever and may be sweating.
- + He feels weak and ill.
- + The ill person's abdomen may be swollen.
- + Traveller's diarrhoea can be accompanied by vomiting.
- + There may be blood in the stools. This is a sign of dysentery, and is a serious form of diarrhoea.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves.
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
  - + Check whether the ill person is conscious if necessary.
  - + Open the airway and check the ill person's breathing if necessary.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the diarrhoea does not go away after 24 to 48 hours;
    - o the ill person passes stools more than 6 times a day (24 hours);
    - o the overall condition of the ill person deteriorates;
    - o the ill person is taking important medication (for example, heart or diabetes medication);
    - o he exhibits alarming symptoms: bloody diarrhoea, pus or mucus in the stools, high fever (more than 38.5 °C) or severe cramps;
    - o the ill person is pregnant;
    - o he is a young child or elderly person;
    - o you are in doubt.
4. Administer further first aid
  - + Help the ill person to move if possible (for example, to the toilet).
  - + Check if the ill person has other symptoms (for example, fever, vomiting or severe abdominal cramps).
  - + If necessary, help replace the clothing and/or bed linen of the ill person.
  - + Try to prevent dehydration and advise the ill person to drink small amounts of water regularly. This is an exception to principle 4 of first aid. Other good alternatives are sports drinks, tea or

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<sup>389</sup> ES Motion sickness – Eating or drinking: p788 in summary book: There is limited evidence in favour of consuming ginger before travelling.

light bouillon (EB<sup>390</sup>, weak recommendation, very low quality evidence). There are also commercial salt solutions on the market (ORS solution or oral rehydration salts) (EB<sup>391</sup>, weak recommendation, low quality evidence; EB<sup>392</sup>, strong recommendation, moderate quality evidence).

- + Babies and young children with a mild form of diarrhoea can just continue to drink the usual bottle or breast milk.
- + If you observe signs of dehydration, administer the appropriate first aid for this symptom (see Dehydration).
- + The ill person may eat something if he wants to. He can eat whatever he likes. Advise the ill person not to eat or drink spicy or gas-forming foods. For example, most people are sensitive to certain spices (pepper, sambal, paprika, garlic), strong coffee, alcohol, onions, leek, brassica and sprouts.
- + If the ill person frequently suffers from disturbing diarrhoea, with no other significant symptoms, he may decide to take medication to stop the diarrhoea. Consult a doctor or pharmacist for a recommendation.
- + Take off your disposable gloves and wash your hands after administering first aid.

In the case of disturbing diarrhoea without serious symptoms, the ill person can use medication to stop the diarrhoea, combined if necessary with an antimicrobial drug. Do not self-medicate. The use of anti-diarrhoeals can be dangerous, for example in the case of dysentery. Do not let the ill person take an anti-diarrhoeal if you observe alarming symptoms: bloody diarrhoea, pus in the stools, high fever (more than 38.5 °C) or severe cramps. In these cases, treatment with antibiotics under medical supervision is recommended.

When administering first aid to an ill person suffering from diarrhoea, it is very important to avoid becoming contaminated yourself. You can do this by wearing disposable gloves if there is a possibility of coming into contact with the stools. After contact with the ill person, wash your hands thoroughly with water and soap (EB<sup>393</sup>, strong recommendation, moderate quality evidence). Additionally, you can also use hand alcohol to disinfect your hands (see Hand hygiene) (EB<sup>394</sup>, weak recommendation, low quality evidence).

## Preventing traveller's diarrhoea

The preventive measures below will significantly reduce the risk of serious diarrhoea. However, they will not always prevent someone contracting traveller's diarrhoea.

- + Wash your hands frequently with water and soap (EB<sup>395</sup>, strong recommendation, moderate quality evidence). Especially in the following cases:

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<sup>390</sup> ILCOR FA 584: Exertion-related dehydration therapy: We suggest that first aid providers use 3% to 8% CE drinks for treating exertion-related dehydration. If 3% to 8% CE drinks are not available or not tolerated, alternative beverages for rehydration include water, 12% CE solution, coconut water, 2% milk, tea, tea-CE, or caffeinated tea beverages.

<sup>391</sup> ES Dehydration – Oral rehydration solution (ORS): p406 in summary book: There is limited evidence showing no difference between ORS use and IVT.

<sup>392</sup> ES Dehydration – Reduced osmolarity ORS: p409 in summary book: There is limited evidence in favour of reduced osmolarity ORS.

<sup>393</sup> ES Diarrhoea – Hand washing: p323 in summary book: There is evidence in favour of hand washing.

<sup>394</sup> ES Diarrhoea – Hand sanitisers: p326 in summary book: There is limited evidence in favour of alcohol-based hand sanitisers.

<sup>395</sup> ES Diarrhoea – Hand washing: p323 in summary book: There is evidence in favour of hand washing.

- after contact with someone who is vomiting or has diarrhoea (EB<sup>396</sup>, weak recommendation, very low quality evidence);
  - after using the toilet;
  - before, during and after cooking (when touching food) (EB<sup>397</sup>, weak recommendation, very low quality evidence);
  - before a meal;
  - after contact with animals (EB<sup>398</sup>, weak recommendation, very low quality evidence).
- Additionally, you can also use hand alcohol to disinfect your hands (EB<sup>399</sup>, weak recommendation, low quality evidence).
- + In some foreign countries the tap water is not always drinkable (EB<sup>400</sup>, weak recommendation, very low quality evidence). Consult a travel guide or tourist office before you leave. Where possible, drink bottled water that you have opened yourself (or that is opened in your presence). Also avoid ice cubes in these circumstances, as these may be made with unclean water. If there is no bottled water available, you should always boil or sterilise the tap water. This is especially important when travelling to less developed countries. You cannot make water completely bacteria-free, but the following measures will reduce the risk of infection (EB<sup>401</sup>, strong recommendation, moderate quality evidence):
    - filter visibly cloudy water (for example, using a coffee filter or a clean handkerchief) before sterilising or boiling it;
    - bring the water to the boil point (until you can see large air bubbles);
    - clean the water in a special water filter for adventurous travellers (ask for expert advice on how to use them);
    - disinfect the water with chlorine drops or tablets. These can be purchased in specialist outdoor shops.
  - + If someone in your environment has diarrhoea, avoid:
    - using the same cutlery or glass;
    - contact with weak or vulnerable people;
    - do not let this person prepare the meal.
  - + In less hygienic circumstances, avoid the following foods (see Food poisoning) (EB<sup>402</sup>, weak recommendation, very low quality evidence):

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<sup>396</sup> ES Diarrhoea & Dehydration – Contact: p367 in summary book: It was shown that the following risk factors resulted in a statistically significant increased risk of *Campylobacter/Cryptosporidium/E. coli* O157:H7 infection or risk of diarrhoea: children <6 yr at home with diarrhoea, persons >5 yr at home with diarrhoea, contact with household member with diarrhoeal illness, contact with non-household member with diarrhoeal illness, contact with ill person past 2 weeks, dog had diarrhoea, having a pet with diarrhoea.

<sup>397</sup> ES Diarrhoea & Dehydration – Kitchen hygiene: p396 in summary book: it was shown that not washing hands after handling raw ground beef resulted in a statistically significant increased risk of *E. coli* O157:H7 infection.

<sup>398</sup> ES Diarrhoea & Dehydration – Contact: p367 in summary book: There is conflicting evidence concerning having pets/animals at home. There is conflicting evidence concerning a farm visit/contact with farm animals. Expert opinion: handen wassen na contact met dieren aanbevelen.

<sup>399</sup> ES Diarrhoea – Hand sanitizers: p326 in summary book: There is limited evidence in favour of alcohol-based hand sanitisers.

<sup>400</sup> ES Diarrhoea & Dehydration – drinking and swimming: p377 in summary book: There is conflicting evidence concerning drinking tap water. Expert opinion: Do not use tap water in the event of poor hygienic circumstances.

<sup>401</sup> ES Diarrhoea – Water purification: p330 in summary book: There is evidence in favour of chlorination, ceramic, sand or Lifestraw® filtration and flocculation and disinfection to purify water.

<sup>402</sup> ES Diarrhoea & Dehydration – food: p382 in summary book: It was shown that the following risk factors resulted in a statistically significant increased risk of *E. coli* O157:H7 or *Salmonella* infection: eating pink ground beef, eating pink ground beef patties, eating a hamburger cooked less than usual, eating at table-service restaurant, eating pink hamburger at home, eating pink hamburger away from home and consumption of raw or undercooked ground beef. It was shown that the following risk factors resulted in a statistically significant decreased risk of

- raw vegetables and cold salads;
  - uncooked or unbaked food (meat or fish) or food containing these ingredients;
  - milk products using non-pasteurised or uncooked milk;
  - food that has been standing at room temperature for a long time;
  - fruit that you cannot peel yourself;
  - tap water (also to be avoided for cleaning your teeth) and ice cubes;
  - local products that do not look or smell fresh;
  - water from bottles that have been opened out of your sight;
  - food (including ice cream) from a stall.
- + Avoid swallowing any water when swimming in open water (EB<sup>403</sup>, weak recommendation, very low quality evidence).
  - + Do not use antibiotics or other medicines to prevent traveller's diarrhoea. These are intended as a means of treatment. You can however be vaccinated against certain types of diarrhoea. Consult a specialist before you travel.

## 2.5 A blood clot in your leg veins

### What do you see?

The symptoms experienced by the ill person can vary according to the size and location of the clot.

- + One or both of the ill person's legs may be swollen and painful.
- + The leg skin may be discoloured.
- + In some cases bulging veins can be seen under the skin on the legs.
- + The ill person may have a fever.
- + The ill person may exhibit sudden symptoms of a pulmonary embolism during or after the journey (see Pulmonary embolism).

### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
3. Seek help from a specialist
  - + Always seek help from a specialist. The ill person is at risk of developing a pulmonary embolism and must be treated quickly.
  - + Call the emergency services on 112 if the ill person shows signs of a pulmonary embolism (see Pulmonary embolism) or if you are in doubt.
4. Administer further first aid

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*Cryptosporidium/Salmonella* infection: eating uncooked carrots and consumption of carrots. It was shown that the following risk factors resulted in a statistically significant increased risk of *Salmonella* infection: storage of eggs > 2 weeks and consumption of raw or undercooked eggs. It was shown that consumption of curd/cottage cheese resulted in a statistically significant increased risk of *Campylobacter* infection.

<sup>403</sup> ES Diarrhoea & Dehydration – drinking and swimming: p377 in summary book: It was shown that the following risk factors resulted in a statistically significant increased risk of *Cryptosporidium/Giardia* infection: exposure to any recreational water, recreational fresh water contact, and swallowed water while swimming.

## Preventing a blood clot in your leg veins

- + Consult your general practitioner before travelling if you have to sit still for a long period of time (for example, a long flight or bus journey) or if you recognise one or more risk factors (see above). He may prescribe medication to greatly reduce the risk of clot formation.
- + For those with a higher risk of thrombosis it may be recommended, on the advice of a doctor, to wear support tights during the flight or journey. There are special models on the market to prevent clot formation (EB<sup>404</sup>, weak recommendation, very low quality evidence).
- + Sit in an aisle seat in the aeroplane or bus (EB<sup>405</sup>, weak recommendation, very low quality evidence). That will give you more room to stretch your legs.
- + Move your ankles and legs regularly if you are sitting for a prolonged period (EB<sup>406</sup>, weak recommendation, very low quality evidence). Make sure that the space for your feet remains free so that you have enough space to move (do not put your hand luggage there).
- + Wear loose clothing if you are embarking on a long journey.
- + Place both feet flat on the ground.

# 3. Problems in heat and cold

## 3.1 What is it?

The human body tries, regardless of the ambient temperature, to keep its core temperature or internal body temperature constant at around 37 °C. The core temperature or central body temperature is the temperature of the brains, heart, lungs and abdominal organs. A constant temperature of these bodily zones is necessary for the normal functioning of all vital functions of the body. The body temperature varies in healthy people between approximately 36 °C and 37.5 °C, though a temperature between 35 °C and 36 °C is also regarded as normal. Over the course of the day, the temperature may fluctuate a few tenths of a degree. The lowest temperature is usually recorded in the morning. At this temperature all the processes in the body function normally. At lower temperatures many processes slow down, and at higher temperatures important proteins (for example, enzymes) will be damaged, thus disrupting the bodily processes.

If the body temperature becomes too high or too low, various mechanisms attempt to ensure that it can return to the normal level. The temperature regulation is a complex mechanism that is controlled by the hypothalamus, a small gland right in the centre of the brain. The hypothalamus acts as a 'thermostat': it regulates the temperature of the blood, skin, muscles, etc. It ensures that the body develops reactions to keep the core temperature more or less constant.

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<sup>404</sup> ES Embolism/deep vein thrombosis – Compression stockings: p807 in summary book: There is limited evidence in favour of wearing stockings.

<sup>405</sup> ES Embolism/deep vein thrombosis – Risk factors: p809 in summary book: It was shown that sitting on a window seat resulted in a statistically significant increased risk of venous thrombosis, compared to sitting on an aisle seat.

<sup>406</sup> ES Embolism/deep vein thrombosis – Exercise: p803 in summary book: There is limited evidence in favour of exercises.

## 3.2 Hypothermia

### What do you see?

For the purposes of administering first aid, it is not relevant to make a distinction between mild and severe hypothermia. This is why we make no distinction here.

- + The ill person is situated in a cold environment (or he has just moved from a cold to a warm environment).
- + The ill person begins to shake uncontrollably and his teeth are chattering. If the hypothermia persists, this will gradually stop.
- + His skin is cold, pale and dry, and this evolves to blue lips, ears, fingers and toes.
- + The breathing evolves from rapid to slow and superficial.
- + The ill person finds it increasingly difficult to move: the muscles become stiff and his movements become less coordinated. Talking also becomes more difficult and may slow down.
- + The ill person is often confused. Sometimes those suffering from hypothermia may take off their clothes (paradoxical undressing, which means that the ill person gets undressed while suffering hypothermia, whereas the reverse response might be expected).
- + He may also exhibit other signs of impaired consciousness such as drowsiness, memory loss, irrational behaviour and fatigue. He will eventually lose consciousness.

### This is what you should do!

1. Make the area safe
  - + Avoid unnecessary and especially brusque and sudden movements when dealing with a hypothermic person (EB<sup>407</sup>, weak recommendation, moderate quality evidence). There is a risk that life-threatening cardiac arrhythmias will result. Move someone suffering from hypothermia horizontally.
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
  - + Check whether the ill person is conscious.
  - + Open the airway and check the ill person's breathing. Do this for a sufficient amount of time. The breathing of someone suffering from hypothermia slows down to such an extent that he seems not to be breathing.
3. Seek help from a specialist
  - + Call the emergency services on 112 if:
    - o the ill person stops shaking;
    - o his muscles stiffen;
    - o he exhibits signs of impaired consciousness.
4. Administer further first aid
  - + If possible, take the ill person to a warmer environment or protect him from further cooling.
  - + If the ill person's clothes are wet (for example, in a drowning incident), take them all off. If he is unconscious and has stopped shaking, do this very carefully, by for example cutting loose the clothing. Dry the ill person. Cover him to keep him warm.
  - + Measure the body temperature of the ill person.
  - + Do not rub the ill person warm. This can cause damage to the skin and underlying muscles by moving the ice crystals that have appeared there.
  - + Is the ill person still shaking and is he wide awake?

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<sup>407</sup> ES Hypothermia – Exercise: p710 in summary book: There is limited evidence in favour of shivering only. There is limited evidence either in favour of the exercise combined with shivering or shivering only.

<p>Yes. Carry out a <b>passive warm-up</b>: the ill person is warming up by himself.</p>	<p>No. The situation is serious! Carry out an <b>active warm-up</b>: apply warmth from the outside.</p>
<ul style="list-style-type: none"> <li>+ Have the ill person warm up in a sleeping bag. If you do not have a sleeping bag, you can use any kind of blanket (for example, an duvet or fleece blanket) if possible in combination with an insulation blanket. Cover the ill person's head as well, since a lot of heat will escape from this part of the body.</li> <li>+ Have him put on warm, dry clothing.</li> <li>+ Give him a hot, sugary drink such as tea or hot chocolate (but only do so if the ill person is wide awake). This is an exception to principle 4 of first aid.</li> </ul>	<ul style="list-style-type: none"> <li>+ Warm up the ill person actively, preferably under an electric blanket. If you do not have an electric blanket, use other warm objects such as cherry pit cushions or a hot water bottle. There are also heat pouches specially designed for this purpose. Make sure that the ill person does not get burnt (by for example placing a blanket between the skin and the hot object).</li> <li>+ The ideal method is to warm up the ill person by body contact (for example, by lying together in a sleeping bag) (EB<sup>408</sup>, weak recommendation, moderate quality evidence). However, for the purposes of first aid, this technique is difficult to apply.</li> </ul>

You should not direct heat sources at the limbs. Heat that is applied too far away from the body's core can cause an 'afterdrop' phenomenon. This is a further fall in the core temperature due to the return of cold blood from the exterior of the body (from the periphery) to the core of the body.

The cold blood should mix slowly with the warmer blood of the body's core. That is what will happen if the body is warmed up gradually. This is why we do not recommend taking a warm bath or warm shower in the case of hypothermia. Once the ill person has reached a normal body temperature, he may take a warm bath or shower.

For the purposes of administering first aid, it is not relevant to make a distinction between mild and severe hypothermia. This is why we give two criteria that are (more) recognisable:

- + Is the ill person still shaking?
- + Is he wide awake?

The answer to these questions will determine the treatment you administer.

- + If the answer to both questions is 'yes', the ill person can warm himself up. Ensure that he does not lose any more heat, by protecting him with a sleeping bag. Heat is generated (passive warm-up) by the shaking (movement of the muscles).
- + If the answer to both questions is 'no', then the ill person is no longer able to warm himself up. In that case you as the first aider will have to help him with the aid of warm objects or body contact (active warm-up).
- + If the answer to one question is 'yes' and to the other 'no', respond as if the answer to both questions is 'no'.

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<sup>408</sup> ES Hypothermia – Active rewarming: p704 in summary book: There is limited evidence either in favour of body-to-body contact or shivering only in subjects with mild hypothermia. There is limited evidence either in favour of body-to-body contact followed by use of a blanket for 30 minutes, or the use of a blanket for 30 minutes in subjects with severe hypothermia. The expert panel recommends using body contact.

- + It is often said that drinking alcohol warms you up. However, this is not the case, even though the ill person might perceive it as such. Alcohol may dilate the blood vessels, causing the body to lose heat more quickly. It is therefore best to avoid drinking alcohol with the aim of getting warm: it may well have the opposite effect. There is no real clarity about the exact mechanism underlying alcohol and hypothermia.
- + Sometimes a low body temperature can also protect against the damaging effects of a lack of oxygen. Is the ill person unconscious and not breathing? Always resuscitate, even if he feels cold!

### Preventing hypothermia

- + You can prevent hypothermia by wearing the appropriate clothing (EB<sup>409</sup>, weak recommendation, low quality evidence). Wear clothes in layers (a (warm) layer of air will become trapped between the various layers and act as insulation), wear a hat, put on a scarf and gloves.
- + Plan ahead. Weather conditions can quickly change in mountainous areas. The temperature can fall significantly especially at night. Make sure you have an insulation blanket in your first aid kit: it is light and will keep your body warm in an emergency.
- + Take spare clothes as well (and keep them dry) if you are going on a serious mountain climb. This is important for water activities, even if it is not cold outside.
- + Take snacks and something to drink along for the road, so that you can top up your energy reserves in time.
- + Never venture into the mountains on your own. Alert other people if you go on a hike and stick to the route you have told them.
- + Limit your alcohol intake (EB<sup>410</sup>, weak recommendation, low quality evidence) or medication that affects your consciousness (for example, antidepressants or sleeping tablets). There is a chance that you might not feel the cold if you take these.
- + Protect yourself against the wind. The more wind, the faster you will cool down. A windproof and waterproof jacket is ideal for minimising heat loss.
- + If your clothes are wet, change into something dry as soon as possible (this also applies if you are sweating after exercise).
- + Wear waterproof clothing on cold, damp (snowy) days.
- + Be sure to wear waterproof gloves and shoes as well.
- + Do not ignore shivers: they are the first sign that your body temperature is falling. Go indoors if possible.
- + Keep a blanket and an insulation blanket in your car.
- + Wear warm clothing (or at least take a jacket with you). Plan for the possibility of standing outside the car for a long time, for example if you break down on the motorway. Make sure all passengers take warm clothing with them. Provide warm clothing for children as well.

## 3.3 Frostbite

### What do you see?

- + The person's skin is initially red. After a while patches appear and the frozen parts turn blue.

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<sup>409</sup> ES Hypothermia – Special clothing: p714 in summary book: There is limited evidence in favour of using a windbreaker jacket and windbreaker pants.

<sup>410</sup> ES Hypothermia – Alcohol intoxication: p696 in summary book: There is limited evidence for harm from alcohol in case of hypothermia.

- + There may be visible blisters, filled with dark fluid. In serious cases the skin first turns white, then black and then dies off. At this stage the skin may come loose.
- + The person experiences a tingling, burning sensation that then turns into serious pain. Later he will have no sensation at all in the frozen body part (numbness).
- + In some cases you will notice that the part of the person's body is stuck to a frozen object.

### This is what you should do!

1. Make the area safe
  - + If necessary put on work gloves that are resistant to cold temperatures.
  - + Is the person stuck to a frozen object (for example, to the inside of a freezer)? Turn off the power if it is an electrical device. Then pour copious amounts of luke-warm water over the place to which the person is attached in order to release him.  
Never use sharp objects to free the person. You might risk making the injuries worse.
2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
  - + Check consciousness if necessary.
  - + Open the airway and check the person's breathing if necessary.
3. Seek help from a specialist
  - + Always seek help from a specialist.
4. Administer further first aid
  - + Protect the person against (further) hypothermia:
    - o take him to a sheltered location;
    - o remove wet clothing;
    - o dry someone who is wet;
    - o cover the person to keep him warm.
  - + Remove rings, but only if this will not cause a skin injury.
  - + If you are sure that there is no danger of renewed freezing, you can gradually bring the affected part of the body up to temperature:
    - o Advise the person to stick his hands in his armpits.
    - o Have the person submerge his hands or feet in luke-warm to warm water (approximately 37 °C to maximum 42 °C).
    - o Carefully warm up the bodypart actively: use a cherry pit cushion, a hot water bottle or a heat pouch. Do not rub.
  - + If the person's feet are frozen, do not let him walk on them. However, if you cannot thaw the feet (for example, those of a mountain climber who is high up in the mountains) or if there is a risk that once thawed the feet will freeze again, have the person walk until he reaches a place where he can warm up.
  - + Do not burst any blisters (EB<sup>411</sup>, weak recommendation, low quality evidence).
  - + Apply a protective bandage and ensure that the warmed up bodyparts do not freeze again.
  - + Take off your disposable gloves and wash your hands after administering first aid.

### Preventing frostbite

- + As far as possible, stay indoors in extreme cold.

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<sup>411</sup> ES Burns – Deroofing or aspiration: p107 in summary book: There is limited evidence in favour of keeping a blister intact.

- + Wear clothing that is suitable for low temperatures. Dress in layers, so that the air between them acts as a layer of insulation. When dressing, pay particular attention to the extremities: fingers, toes, ears and nose (EB<sup>412</sup>, weak recommendation, low quality evidence).
- + Wear protective clothing if you use extremely cold products (for example, liquid nitrogen) or if you have to work in a cold environment.
- + Do not touch frozen objects with wet hands (such as ice cubes or the metal grid of a freezer).
- + Do not use moisturisers to prevent frostbite (EB<sup>413</sup>, weak recommendation, very low quality evidence). Most skin creams have a cooling effect.

## 3.4 Heat and sun stroke

### What do you see?

- + The person is situated in a warm and humid environment (or has just moved from a warm to a somewhat cooler environment).
- + The person may have just undertaken some serious exertion.
- + He may have a headache and may feel dizzy.
- + The person may see black spots before his eyes, be dizzy or even feel faint.
- + He may feel nauseous and vomit.
- + He may be suffering from muscle or abdominal cramps.
- + The skin is red. In the beginning the person sweats profusely, but the sweating diminishes after a while (by drinking too little or because of the sweat evaporating he will become dehydrated). Later the skin becomes dry.
- + The muscles may cramp up (see Heat cramp).
- + He may suffer convulsions.
- + He may exhibit impaired consciousness (confusion, drowsiness and even unconsciousness).

### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious if necessary.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services on 112 if:
    - o the person has impaired consciousness;
    - o he exhibits abnormal behaviour or suffers convulsions;
    - o he stops sweating;
    - o he cannot drink anything without vomiting;
    - o his body temperature is higher than 39 °C.
4. Administer further first aid
  - + Let the person rest, with no further exertions. Ensure that he remains as calm as possible.
  - + Take the person out of the sun or out of the warm environment into a cool environment.
  - + Remove any excess clothing.

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<sup>412</sup> ES Frostbite – Special clothing: see appendix 5: There is limited evidence in favour of wearing a hat with earflaps and wearing a scarf.

<sup>413</sup> ES Frostbite – Protective emollients: p719 in summary book: There is limited evidence for harm when using protective emollients.

- + Cool down the person immediately (EB<sup>414</sup>, weak recommendation, low quality evidence). The more serious the symptoms of the person, the more drastic the measures you can take to cool him down:
  - o Direct a fan at the person.
  - o Put ice cubes in a bag of water, cold bags or wet and cold (face)cloths on the body (for example, in the groin area, under the armpits or around the neck: these are the areas where there are major blood vessels, which will speed up the cooling down process).
  - o Spray or pour cold water over the person. If necessary, use a watering can.
  - o Submerge his hands and feet in cold water.
- + Measure the body temperature of the person.
- + Are the symptoms the result of heavy exertion and is the person wide awake? If so, give him something cool to drink (for example, a sports drink, water or cold tea) (EB<sup>415</sup>, weak recommendation, very low quality evidence). This is an exception to principle 4 of first aid.
- + Do not give the person anti-pyretics. Fever has a different pathogenesis (see Fever).

### Preventing a heat stroke

- + Avoid heavy exertion on hot days or in a hot environment if you are not specifically prepared for these conditions (with training or acclimatisation, which means that you get used to the temperature before you do any physical exertion) (EB<sup>416</sup>, weak recommendation, very low quality evidence.)
- + Drink enough if it is hot (EB<sup>417</sup>, weak recommendation, very low quality evidence). Drink regularly, preferably in small quantities each time. Eat meals that contain a lot of liquid (such as cold soup, yoghurt, fruit or raw vegetables).
- + If you feel uncomfortable on hot days (for example, as an elderly person), consider buying an air conditioning appliance (EB<sup>418</sup>, weak recommendation, very low quality evidence).
- + Never leave anyone in a car parked in the sun (that includes animals). The temperature in a car can rise very quick.
- + Dress according to the weather: wear light clothing if it is hot (EB<sup>419</sup>, weak recommendation, very low quality evidence).
- + Keep an eye out for elderly people in your neighbourhood: drop in on them at regular intervals, fetch their shopping (for example, fruit and vegetables) and make sure they drink enough. They may not feel thirsty or may not be able to express it. This applies to children as well (EB<sup>420</sup>, weak recommendation, very low quality evidence).

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<sup>414</sup> ES Heat stroke – Cooling: p722 in summary book: There is limited evidence in favour of cooling.

<sup>415</sup> ILCOR FA 584: Exertion-related dehydration and oral rehydration: We suggest that first aid providers use 3% to 8% CE drinks for treating exertion-related dehydration. If 3% to 8% CE drinks are not available or not tolerated, alternative beverages for rehydration include water, 12% CE solution, coconut water, 2% milk, tea, tea-CE, or caffeinated tea beverages.

<sup>416</sup> ES Heat stroke – Reduction of activity: p726 in summary book: There is limited evidence for the benefit of reduced activity.

<sup>417</sup> ES Heat stroke – Drinking: p728 in summary book: There is limited evidence in favour of taking extra liquids.

<sup>418</sup> ES Heat stroke – Fan/air conditioning: p730 in summary book: It was shown that the following risk factors resulted in a statistically significant decreased risk of all-causes deaths during heath waves: having a working home air-conditioning, using a cooling device or techniques or visiting other air-conditioned places.

<sup>419</sup> ES Heat stroke – Special clothing: p734 in summary book: There is limited evidence for the benefit of dressing lightly.

<sup>420</sup> ES Heat stroke – Social contact: p736 in summary book: There is limited evidence for the benefit of increased social contact.

## 3.5 Heat cramp

### What do you see?

- + The person shows signs of heat stroke after intense exertion in a warm environment (see Heat and sun stroke).
- + The person's muscles are cramped. This cramping usually occurs in the calf, arm, stomach or back muscles.
- + The person may complain about swollen fingers.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the injured person
  - + Find out what is wrong with the person.
  - + Check whether the person is conscious if necessary.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Seek help from a specialist if the cramping persists.
  - + Call the emergency services on 112 if:
    - o the person has impaired consciousness, exhibits abnormal behaviour or has difficulty breathing;
    - o he stops sweating.
4. Administer further first aid
  - + Let the person rest, with no further exertions. Ensure that he remains as calm as possible.
  - + Take the person somewhere cool.
  - + Remove any excess clothing.
  - + Measure the body temperature of the person.
  - + Focus on the symptoms of heat stroke first (see Heat and sun stroke).
  - + Is the person wide awake? If so, give him something cool to drink (for example, a sports drink, water or cold tea). This is an exception to principle 4 of first aid.
  - + Stretch the cramped muscle carefully and gradually (see Muscle cramp).

## 3.6 Sweat rash

### What do you see?

- + The person has small red spots or blisters, especially in skin folds (in the armpits or around the groin) or where clothing rubs the skin.
- + The skin rash stings.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves.
2. Assess the condition of the ill person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if the sweat rash persists or if the rash is severe.
4. Administer further first aid
  - + Let the person rest, with no further exertions. Ensure that he remains as calm as possible.

- + Cool and dry the irritated area.
- + Try to prevent the person from scratching, as this can make the wounds worse.
- + Take off your disposable gloves and wash your hands after administering first aid.

### Preventing sweat rash

Do you often get sweat rash?

- + Avoid intense exertion.
- + Rinse your skin regularly in the shower (without soap, so that your skin does not dry out).
- + Wear loose cotton clothing.

## 3.7 High ozone levels

### What do you see?

- + The person is coughing and may have trouble breathing.
- + The person's eyes and throat may be irritated.
- + Sensitive people may sometimes feel anxious, dizzy or nauseous. They may also suffer from headache and chest pain.

### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Seek help from a specialist if the symptoms get worse.
4. Administer further first aid
  - + Let the person rest, with no further exertions. Ensure that he remains as calm as possible.
  - + Take the person somewhere cool. It is best to stay inside, where the ozone levels are lower.

### Preventing suffering caused by high ozone levels

- + Stay inside: there is less ozone inside than outside.
- + Take sufficient rest and limit the amount of physical exertion.
- + Drink more than usual if it is warm.
- + Schedule sports and playing activities to cooler times of the day (not between 11 am and 10 pm due to higher ozone levels and temperatures).

For more information, consult the Flemish Environmental Agency website on [www.luchtkwaliteit.vmm.be](http://www.luchtkwaliteit.vmm.be).

## 4. Accidents involving electricity

### 4.1 What is it?

When the human body comes into contact with two points that have a different voltage an accident involving electricity will occur. These two points may be two live wires, one live wire and the earthing, or one live wire and the ground. The body acts as a conductor for the electricity between these two

points. Electricity does not select the shortest path between two points but the path of least resistance. In the human body, this means the nerves, blood vessels, muscles and skin.

An accident involving electricity can for example occur when carrying out electrical work. It may be an accident at low voltage (as is usually the case) or an accident at high voltage:

- + **Low voltage** is an alternating current of less than 1000 volts, for example in a household appliance of 220 volts. In the case of an accident at low voltage, the current passes through the body. These accidents can occur at home, for example, when you pull the plug of an electrical household appliance out of a socket with wet hands.
- + **High voltage** involves an alternating current upwards of 1000 volts, as with high voltage masts or the overhead cables of a train. Cables such as these that have been severed present an extremely risky situation. In the case of an accident involving high voltage, the current does not pass over the body, but passes through the body. This gives rise to serious injuries. An accident involving high voltage is always serious. The injured person may even be hurled some distance by the surge of power. This is because there is a movement of air resulting from the heat around the body. Such accidents can for example occur when working in an electrical junction box or when a high voltage cable is damaged (for example, during a train accident).

A specific form of accident involving electricity may occur if the injured person is situated in the area where lightning strikes (see Lightning strike).

## 4.2 Accident involving electricity

### What do you see?

In an accident involving electricity there are usually injuries. These can vary depending on how serious the accident is, and whether the accident occurred with low or high voltage. These injuries can vary from burns and/or muscle cramps to cardiac or respiratory arrest. In some cases the person may get away with just a fright.

Usually you will be able to deduce from the circumstances whether it is an accident involving low or high voltage.

Look around and try to assess the situation. Is it an accident involving low voltage?

Yes: low voltage	No: high voltage
<ul style="list-style-type: none"> <li>+ You deduce from the situation that the injured person has been involved in an accident at low voltage: you can for example see an electrical appliance still plugged in to the socket.</li> <li>+ The injured person may be unconscious.</li> <li>+ He may have trouble breathing or suffer respiratory arrest.</li> <li>+ The injured person may experience cardiac arrhythmias or suffer cardiac arrest.</li> <li>+ The injured person often has one or more burns. Look in particular at the site where the injured person was in contact with the power source (for example, the hands), and then to the area where the power left the body. There may also be internal injuries.</li> <li>+ The injured person may have severe muscle cramps.</li> </ul>	<ul style="list-style-type: none"> <li>+ You deduce from the situation that the injured person has been involved in an accident at high voltage: there is for example an open junction box or a broken high voltage cable.</li> <li>+ The injured person exhibits one or more symptoms as in the case of a low-voltage accident (unconsciousness, breathing difficulties or respiratory arrest, heart arrhythmias or cardiac arrest, burns).</li> <li>+ The injured person may also have been flung through the air because of the force of the electric shock, and therefore be located some distance from the power source.</li> <li>+ This air displacement can tear clothes and the injured person's gloves or helmet may also be ripped off.</li> </ul>

**This is what you should do!**

Low-voltage accident	High-voltage accident
<p>1. Make the area safe</p> <ul style="list-style-type: none"> <li>+ Safety is a priority!</li> </ul>	
<ul style="list-style-type: none"> <li>+ Never touch an injured person who is connected to a power source, unless the power has been switched off.</li> <li>+ Switch off the power source as quickly as possible. You can do this by:                             <ul style="list-style-type: none"> <li>o pulling out the plug of the electrical appliance from the socket (if possible);</li> <li>o removing fuses or switching off the automatic circuit breaker;</li> <li>o switching off the main switch.</li> </ul> </li> <li>+ Ensure that the power cannot be switched back on again.</li> <li>+ Release the injured person from the electrical object (for example, if he is holding on tight to a cable).</li> </ul> <p>If you cannot switch off the power, try to separate the injured person from the power source. Wait for the emergency services if this is not possible. Do not take any risks.</p>	<ul style="list-style-type: none"> <li>+ Do not approach the power source or the injured person. A high-voltage cable that has broken off and is lying on the ground may still be live. The ground in a radius of several metres from that site is also live.</li> <li>+ Moreover, high voltage can 'skip'. This means that you can be electrocuted if you are in the area of a conductor even if you do not come into direct contact with it. <b>Stay at a distance of at least 10 metres from any high-voltage installation.</b></li> <li>+ Do not remove the source of power (in contrast to a low-voltage accident), not even with an object that does not conduct electricity. The voltage is too high.</li> </ul>

<ul style="list-style-type: none"> <li>+ Insulate yourself from the ground: stand on a wooden stool or another dry insulating material (for example, a pile of newspapers or a book).</li> <li>+ Then use an object that does not conduct electricity (for example, a wooden broom handle) to separate the injured person from the power source.</li> </ul>	
<p>2. Assess the condition of the injured person</p>	
<ul style="list-style-type: none"> <li>+ Find out what is wrong with the injured person. Only touch the injured person if he is no longer connected to the power source or if you have switched off the electricity!</li> <li>+ Check whether the injured person is conscious.</li> <li>+ Open the airway and check the injured person's breathing if necessary.</li> </ul>	<ul style="list-style-type: none"> <li>+ Do not touch the injured person!</li> </ul>
<p>3. Seek help from a specialist</p>	
<ul style="list-style-type: none"> <li>+ Always seek help from a specialist even if the injured person is not seriously wounded and feels alright. Anyone involved in an accident with electricity should be examined, even if there appears to be no serious injury. There is always a chance of internal injuries or that symptoms continue afterwards.</li> <li>+ Call the emergency services on 112 if the person is seriously injured.</li> </ul>	<ul style="list-style-type: none"> <li>+ Call the emergency services on 112.</li> </ul>
<p>4. Administer further first aid</p>	
<ul style="list-style-type: none"> <li>+ It is only safe to administer first aid when the power has been switched off, or the injured person has been separated from the power source. At that point the injured person is no longer electrically live.</li> <li>+ Administer first aid to the injured person according to his injuries (for example, cool down burns, resuscitate ...).</li> </ul>	<ul style="list-style-type: none"> <li>+ Leave the emergency services to rescue the injured person.</li> </ul>

### Preventing an accident involving electricity

- + Have the electricity installed in your house by a professional. If you have doubts about the state of an installation (for example, when you buy or rent a property), ask for expert advice.
- + Have a professional carry out electricity repairs.
- + Make sure that there is an earth leakage breaker (or residual current device or a differential safety switch) in the electrical installation. This device is an automatic switch that quickly

switches off the power in the event of current leakage (for example, in the case of a defective appliance, damage to the wire insulation or when touching live parts).

- + Make sure there is good earthing: this is essential in every electrical installation.
- + Do not use electrical equipment near water. Avoid touching electrical appliances with wet hands.
- + Roll out a cable reel (for example, an extension wire) to its full extent, even if you do not need the full length. This is necessary because the resistance in the cables can generate heat in the case of overloading, which can cause the cable insulation to melt (coil effect). This can cause a short circuit and fire.
- + Never work on electrical appliances that are still switched on (for example, to clean them). Never repair electrical appliances yourself; leave it to the experts.
- + If you buy a second-hand electrical appliance, check that it is in good condition.
- + Every electrical appliance sold in Europe must have a conformity symbol (CE marking).
- + Do not pull on the cable itself when removing an appliance from the socket.
- + Make sure that there is no electrical wiring hanging loose or lying on the floor. This way you will not trip over it and there will be no accidents involving young children or pets.
- + Have childproof sockets installed or use cover plates (socket protectors that can only be opened with a special key) to prevent children sticking their fingers or objects into the socket. Teach them that it is dangerous to stick anything into a socket.
- + In the event of a train accident:
  - o Never touch the overhead cables, even if they are on the ground. Keep well away from the overhead cables.
  - o Stay at least 2 metres away from the rails.
  - o If you are in the train: stay there and wait for instructions from the railway personnel or the emergency services. For safety reasons (voltage, other lines in use ...) it is not always possible to evacuate everyone immediately. Do not attempt to leave the train on your own initiative.

## 4.3 Lightning strike

### What do you see?

Someone who is hit by lightning will present with similar symptoms to those arising from an accident involving electricity. In this case the injuries are caused by spontaneous atmospheric electricity (lightning).

- + The injured person may be unconscious.
- + He may suffer respiratory or cardiac arrest.
- + He may have burns that can penetrate deep into the tissue.
- + Serious internal injuries are also a possibility.

### This is what you should do!

1. Make the area safe
  - + Take yourself, the injured person and any bystanders to a safe place. This can be a building, away from the windows, or a closed metal cage like a car. These act as a 'Faraday shield'. Keep all car windows and doors closed. If lightning strikes, you will hear a massive bang and the electronic apparatus in the car may be damaged. Do not shelter under trees.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing if necessary.

3. Seek help from a specialist
  - + Always seek help from a specialist even if the injured person is not seriously wounded and feels alright. Anyone struck by lightning must be examined, even if the injuries do not look very serious. There is always a chance of internal injuries or that symptoms continue afterwards.
  - + Call the emergency services on 112 in the event of serious injuries.
4. Administer further first aid
  - + Administer first aid to the injured person according to his injuries (for example, cool down burns, resuscitate ...).

### Preventing (injuries caused by) lightning strike

- + Seek a safe place to shelter if a thunderstorm is predicted. Do this immediately if the time between lightning and thunder is short. Go into a house or step into a car. A tent, canopy (which is not completely walled in), a bus shelter, a car port, trees or any other open shelter are not safe places to shelter. Close windows and doors. Stay away from windows during a thunderstorm.
- + If you cannot shelter inside during a thunderstorm ...
  - o ... and you are in a forest: crouch down with your feet together and your arms around your knees but not touching the ground. Hold your hands over your ears. Wait until the thunderstorm has finished. Choose a place where there are lots of small trees standing together.
  - o ... and you are in an open field: look for a place that is lower than the surroundings. Crouch down with your feet together and your arms around your knees. Hold your hands over your ears.
  - o ... and you are in a group: disperse the group. Have the group members crouch down with feet together and hands around the knees. Get them to put their hands over their ears.
  - o ... never lie down on the ground. Crouch in a ditch if possible.
- + Do not hold any pointed conductive objects during a thunderstorm (such as an umbrella, a fishing rod or a tent rod) and stay away from objects that may act as an antenna (for example, a flagpole or a high voltage mast).
- + Keep at least 1 metre's distance away from a building to prevent discharge from skipping in the event of a lightning strike to the building.
- + If you are on or in water (for example, swimming, surfing, sailing, rowing ...), make for land as quickly as possible if a thunderstorm is on its way.
- + Do not use a glider, paraglider, hang glider or parachute during a thunderstorm.
- + Do not use a landline during a thunderstorm. If there is a lightning strike in the area, the discharge may spread via the telecommunication cables. For the same reason, unplug all electrical apparatus.
- + Avoid contact with running water during a thunderstorm. Do not take a bath or shower, and do not flush the toilet during a thunderstorm.

## 5. Accidents involving water

### 5.1 What is it?

Water is often associated with having fun. For instance, a kayak ride or messing around in the water with friends in the summer. There are however a number of risks associated with water. There is always the

chance of an accident involving water. Take, for instance, the risk of drowning. Drowning can have various causes. Diving accidents also occur in water. Water can be treacherous. Which is why it is important to be vigilant at all times.

When someone falls into water, that water is rarely clean. There are usually all kinds of substances in it (sea salt, bath foam, chlorine, various pollutants, ...). Having been rescued from drowning, the injured person may develop serious complications after a while, which can even be fatal. It is therefore important to take an accident involving water seriously.

## 5.2 Drowning

### What do you see?

- + The injured person is in the water, is able to swim to safety or has been pulled out of the water.
- + The injured person is unable to breath properly because there is water, mud, seaweed in the airways.
- + The injured person may vomit.
- + He may have suffered a head or spinal injury after diving or falling into shallow water.
- + The injured person is often suffering from hypothermia because the water is colder than his body temperature.
- + After being rescued, there may be complications such as pneumonia or brain damage.

### This is what you should do!

1. Make the area safe
  - + Think of your own safety!
    - o Try to rescue the drowning person without going into the water yourself (from a boat, using a floating device such as a lifebuoy and giving instructions). We call this a dry rescue.
    - o If that does not work, a wet rescue is required. For this, a first aider goes into the water to save the drowning person. Only go into the water (or sea) if you are trained to do so. If the drowning person is conscious, he will panic and hold tight to the rescuer. If you are inexperienced, you can end up in serious difficulties yourself. Do not go into the water without a life jacket and rope secured to the water side.
  - + Pull the drowning person horizontally from the water. In this way you will prevent a fall in blood pressure. When the pressure of the water falls off the body of the drowning person, the blood pressure can fall dramatically. You can use a surfboard or other board to evacuate the drowning person as horizontally as possible.
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing.
3. Seek help from a specialist
  - + Alert the rescue services if they are available (for example, in the swimming bath or at the coast).
  - + Call emergency services immediately on 112. If the person is still in the water, tell the operator that someone is drowning and that you need help to get this person out of the water.
  - + It is a good idea to have someone wait for the emergency services and make yourself recognisable (for example, on the beach).
  - + Seek help from a specialist even if the injured person is not seriously wounded and feels alright. Anyone who has nearly drowned must be examined, even if the injuries do not look very serious. There is always a chance of injuries being present or arising (for example, pneumonia

from swallowing water). Even someone who was conscious when he was rescued from the water should be examined by a doctor.

4. Administer further first aid

- + If the injured person is not breathing, start resuscitation and defibrillation immediately (see Resuscitation). Continue to resuscitate until the emergency services take over. Sometimes an undercooled drowning person can still be saved some time after the drowning. You can also use an automated external defibrillator (AED) for a drowning person. Be careful not to use the AED on a wet chest: dry the injured person's chest first. If possible, make also sure that the injured person is not lying on a wet surface (see Automatic external defibrillator).
- + Bear in mind that the drowning person may have a spinal injury, for example if he has hit his head on the bottom while diving (see Spinal injury).
- + If the drowning person is unconscious but breathing normally, place him in the recovery position (EB<sup>421</sup>, weak recommendation, very low quality evidence). This is because drowning persons often vomit. However, only do this if you do not suspect a spinal injury. If you do suspect that there has been a spinal injury (see Spinal Injury), leave him lying on the ground, as long as he is breathing spontaneously.
- + If possible, take the drowning person to a warmer environment (move him horizontally). If this is not possible, shelter the drowning person as well as you can from the cold and wind (see Hypothermia).
- + Take off all the drowning person's clothes. If he is unconscious and has stopped shaking, do this very carefully, by for example cutting loose the clothing. Dry the drowning person. Cover him to keep him warm.
- + Take his temperature.
- + Do not rub him warm. This can cause damage to the skin and underlying muscles by moving the ice crystals that have appeared there.
- + Try to prevent the injured person from moving as much as possible (EB<sup>422</sup>, weak recommendation, moderate quality evidence)
- + Treat as described for hypothermia (see Hypothermia).

A dry rescue takes priority. You should not enter the water unless you are trained to do so. If you are not specially trained, you will put yourself in a dangerous situation. For example, bear in mind that someone who is drowning will be panicking and take hold of the rescuer.

The first aider or rescuer should preferably remain on dry land and conduct the rescue from there. A wet rescue, whereby the first aider or rescuer goes into the water himself, should be the last resort.

A **dry rescue** can be carried out using tools to be found in the near vicinity. One example is a life buoy. In ideal circumstances, the aids should be attached to a rope. This makes it easier to pull the drowning person to the side. When throwing a floating device, you should take into account the water current. Throw the floating device beyond the drowning person so that you can then pull it closer. A second throw would waste valuable time. Be careful when carrying out a dry rescue not to be pulled into the water in the process. Some tips for this: stay close to the ground and hold yourself steady. If you do not have a life buoy, you can use other equipment (for example, branches, a ball ...).

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<sup>421</sup> ILCOR FA 517: Recovery position: We suggest that first aid providers position individuals who are unresponsive and breathing normally into a lateral, sidelying recovery (lateral recumbent) position as opposed to leaving them supine.

<sup>422</sup> ES Hypothermia – Exercise: p710 in summary book: There is limited evidence in favour of shivering only. There is limited evidence either in favour of the exercise combined with shivering or shivering only.

In the event of water activities there may well be other people around who can come safely to the aid of the drowning person (for example, people in a nearby boat, the rescue services).

If you do decide to go into the water (**wet rescue**), bear in mind that you are putting yourself at the same risk as the drowning person. We therefore only advise this course of action for trained first aiders. Bear in mind the following recommendations:

- + Wading rescue: try wading in to bring the drowning person to the side. Ensure that you are secured to the side and wear a life jacket. Wading is not the safest option: sudden differences in depth, temperature, current and substrate can cause unsafe situations. Some locations, such as swamps, piers, sandbanks and locks, are extremely treacherous and involve (major) unknown risks, making the rescue much more difficult.
- + Going into the water: where and how should you go into the water? How deep is the water? How do you get back to the side with the drowning person? All these questions should be answered before you decide to jump into the water. There might be problems if you jump into the water and do not know what lies below. Rocks or other structures can be hidden under the water's surface and cause serious injuries.
- + Distance: for most people it is exceedingly difficult to estimate distances in water. People usually underestimate. You have to reach the drowning person, but you also have to get back to the side. The current can also play an important role here.
- + Current: in certain locations or at certain times of the day, there will be a very strong current that will defeat even the strongest swimmers. In colder water this can also lead to hypothermia, which seriously impedes swimming.
- + Shipping: you should be extra careful in shipping lanes. A swimmer cannot easily be seen from a boat. Some of the dangers include: being crushed between the boat and the side, coming into contact with the propeller or the suction caused by propeller's on larger ships.
- + The drowning person: don't let the drowning person grab you. Even a child can hold so firmly that you will no longer be able to swim. If you do decide to swim to a drowning person, take something with you that you can use to tow them.
- + Your own swimming ability: swimming with clothes and shoes on is physically exhausting. Sometimes it makes sense to take off heavy clothes before jumping into the water. On the other hand, clothing may protect you against sharp objects and differences in temperature.

In the case of a drowning person who has to be resuscitated, a first aider with a duty to rescue should give five rescue breaths after opening the airways. This can increase the survival chances of a drowning person. After this, the first aider will assess whether the drowning person shows any signs of life. If not, he will continue resuscitation (according to the algorithm of 30 chest compressions and 2 rescue breaths). This change in the action plan for resuscitation is only taught to those who may come into contact more frequently with potential drowning incidents. These are first aiders with a duty to rescue (for example, lifeguards).

Do not waste time 'emptying the lungs'. In some cases, water will not get into the lungs because of severe cramping of the vocal chords upon contact with a little bit of water. Even if there is water in the lungs, you will not be able to get it out. Moreover, a drowning person swallows water initially to prevent inhalation. If you hold a drowning person upside down or push on his stomach, the swallowed water will come out along with the acidic contents of the stomach. There is a risk that this will enter the airways and result in a lung infection (aspiration pneumonia).

## Preventing drowning

- + Never let children play in the vicinity of water without adult supervision; that includes the bathroom or an inflatable swimming pool (EB<sup>423</sup>, weak recommendation, very low quality evidence). Teach them to swim. Children can learn to swim at an early age and become aware of the dangers of water. Make sure young children wear a life-jacket or armbands in or near water (EB<sup>424</sup>, weak recommendation, very low quality evidence).
- + Install a fence around a swimming pool or pond if you have young children (EB<sup>425</sup>, weak recommendation, very low quality evidence).
- + Do not overestimate your own abilities: jumping in to save a drowning person without thinking can also put your life at risk. Make sure you are in good condition if you are going to swim. Leave the water on time if you become cold, feel unwell or get cramp.
- + Never go swimming alone. Be sure to have life jackets, floats and other life-saving equipment if you are doing water sports. Follow the advice of the lifeguard services in this respect. Only swim in supervised areas.
- + Never swim in open water when it is dark.
- + Do not venture on to (natural) ice (for example, a frozen lake), unless it is specifically indicated (for example, by the council or the owner) that the ice is sufficiently thick.

## 5.3 Car in the water

### What do you see?

- + You are a first aider: you see a car drive into the water (for example, a lake, a river ...).
- + You are in the car: you have driven your car into the water.

### This is what you should do!

Are you a first aider?

<b>Yes:</b> first aider	<b>No:</b> driver
<p>1. Make the area safe</p> <ul style="list-style-type: none"> <li>+ Think of your own safety! Do not go into the water if you have not been trained for such incidents. It is a risky undertaking. You have to take into account the current, the temperature of the water, possible obstacles, poor visibility and panicking people (see Drowning).</li> <li>+ Check how many people are in the car.</li> </ul> <p>2. Assess the condition of the injured person</p> <ul style="list-style-type: none"> <li>+ Find out what is wrong with the injured person.</li> </ul> <p>3. Seek help from a specialist</p> <ul style="list-style-type: none"> <li>+ Call the emergency services immediately on 112.</li> </ul>	<ul style="list-style-type: none"> <li>+ Stay calm.</li> <li>+ Turn all the car lights on (including the interior lights). This will help the emergency rescue team to see the car better and those inside will be able to see what they are doing. Leave the ignition on, otherwise the lights or electric windows will not work or you might activate the door locks.</li> <li>+ Undo all safety belts. If you cannot do this, cut through the belts with something sharp (for example, a safety knife).</li> <li>+ Open a side window immediately. If it is not possible to open this in the normal way, break the glass with the bottom of a fire extinguisher. You can also use a rescue</li> </ul>

<sup>423</sup> ES Drowning – Adult supervision: p748 in summary book: There is limited evidence with harm for the absence of adult supervision.

<sup>424</sup> ES Drowning – Flotation device: p744 in summary book: There is limited evidence with benefit for flotation devices.

<sup>425</sup> ES Drowning – Pool fencing: p746 in summary book: There is limited evidence in favour of pool fencing.

<p>4. Administer further first aid</p> <ul style="list-style-type: none"> <li>+ If you have been able to evacuate the people in the car, treat it like a drowning (see Drowning).</li> <li>+ A car that is relatively undamaged and lands in the water can sometimes float for a few minutes. If there are lots of bystanders, you can try to pull the car closer to the side by with a rope or by forming a human chain.</li> <li>+ If you have decided to jump into the water and rescue the people in the car: break a side window with a heavy object if you have one with you, or open a door if those inside have not yet opened a window or door. Do this by placing both feet on the car body and pulling on the handle with great force.</li> <li>+ If the car has sunk, look for tracks on the waterside (tyre tracks, damage or crushed vegetation). Make sure nobody covers these tracks. They are essential for helping the trained rescuers to locate the approximate position of the car.</li> </ul>	<p>hammer if you have one in the car. Do this as quickly as possible, because it becomes more difficult under water. If this doesn't work either, try to open the door by pushing forcibly with your shoulder and arm against the unlocked door.</p> <ul style="list-style-type: none"> <li>+ Hold tight to the car roof and leave the car horizontally, with your back aimed downwards. Exit head first and direct your face upwards.</li> <li>+ Keep hold on the car if you need to help others get out. If you do not do this, you might not be able to find the sinking car again.</li> <li>+ Help young children out of the car.</li> <li>+ If the car is still floating, you can put them on the roof of the car until all those inside have got out.</li> </ul>
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## 5.4 Diving accident

### What do you see?

- + A diver is in difficulty.
- + A diver is having problems after a dive:
  - o pain;
  - o breathing difficulties;
  - o skin symptoms: localised or general itching, colour changes and differences in level on the skin;
  - o muscle and joint pain;
  - o paralysis;
  - o difficulties speaking, hearing or seeing;
  - o shocks and seizures;
  - o dizziness;
  - o sensory impairment;
  - o ...

### This is what you should do!

1. Make the area safe
  - + Think of your own safety!
2. Assess the condition of the injured person
  - + Find out what is wrong with the injured person.
  - + Check whether the injured person is conscious.
  - + Open the airway and check the injured person's breathing if necessary.
3. Seek help from a specialist

- + Call the emergency services on 112 if the injured person has serious or life-threatening symptoms.
  - + Seek help from a specialist in other cases. Anyone who has been involved in a diving accident should be examined by a doctor.
4. Administer further first aid
- + Listen to the advice of an experienced fellow-diver. Let him administer first aid that he has learned.

### Preventing a diving accident

- + Undergo regular medical checks from an experienced doctor before going diving.
- + It may be useful to drink one and a half litres of sports drink before diving to prevent a decompression incident. Drinking a salt-glucose solution can help reduce bubble formation in the blood vessels (EB<sup>426</sup>, weak recommendation, low quality evidence).
- + Do stretching exercises before or while diving. It may help prevent a decompression incident (EB<sup>427</sup>, weak recommendation, very low quality evidence).
- + Follow a proper diving training course.
- + Adhere strictly to all safety instructions.
- + Never go diving alone.
- + Only go diving if you feel fit. Do not dive if you have a cold.

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<sup>426</sup> ES Decompression illness – Drinking: p 750 in summary book: There is limited evidence in favour of drinking before diving. It was shown that drinking 1300 ml of a saline-glucose solution resulted in a statistically significant decrease of bubble production, compared to not drinking before diving.

<sup>427</sup> ES Decompression illness – Exercise: p752 in summary book: There is limited evidence in favour of exercise before diving or during decompression.

**Summaries made for topics for which no evidence could be identified:**

- Skin wounds – Sterile compress/wound plaster/bandage: p94 in summary book
- Altitude sickness – Resting: p762 in summary book
- Altitude sickness – Descending (prevention) : p763 in summary book
- Altitude sickness – Interventions to prevent hypothermia/heat stroke: p764 in summary book
- Altitude sickness – Sleeping medication: p773 in summary book
- Motion sickness – Location on boat: p795 in summary book
- Frostbite – Active rewarming: p716 in summary book
- Frostbite – Irrigation with lukewarm water: p718 in summary book
- Frostbite – Walking on frozen feet: p721 in summary book
- Sweat rash – Cooling or showering: p738 in summary book
- Electrical injuries and lightning injury – Various risk factors: p740 in summary book
- Drowning – Removing the injured person horizontally: p742 in summary book
- Hypothermia – Hot drink: p743 in summary book - Hypothermia – Moving: see appendix 6

**Summaries for which studies have been identified but which have not resulted in a recommendation:**

- Motion sickness – Wristband: p796 in summary book
- Heat stroke – Showers: p733 in summary book

# Allergies

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# 1. What is it?

## Preventing allergic reactions

- + Try to reduce the presence of dust mites in the house as much as possible:
  - o It is a good idea to clean the bedroom and the rest of the house on a regular basis. Avoid using a broom or brush, choose instead a damp cloth or special cloth.
  - o Buy a mattress made of synthetic materials. Cover the mattress with a sheet and use a mattress protector and wash it regularly. Put a slipcover around the pillow and wash this regularly. Wash the duvet, sheets and pillowcases regularly too.
  - o Air your bed during the day.
  - o Do not put linen baskets in the bedroom.
  - o Do not let pets into your bedroom.
  - o Choose smooth flooring (tiles, laminate, cork ...) in your house and in the bedroom. Avoid carpet and rugs.
  - o Avoid fabric covers for furniture. Choose wood, leather or plastic.
  - o Whenever possible, dry the laundry outside.
  - o Do not smoke indoors.
- + Animals may cause allergies with their saliva, skin flakes, hairs and feathers. Allergens can appear on clothing, furniture and floors. Due to movement indoors, they can be transmitted by air. People who are allergic to animals should avoid them.
- + If you suffer from hayfever, the following tips may be useful:
  - o Take regular showers and wash your hair. This will reduce the amount of pollen on your skin and in your hair.
  - o Use disposable tissues to blow your nose. Throw away the tissue after use.
  - o Never hang your washing outside to dry.

# 2. Allergic skin reactions

## 2.1 Urticaria

### What do you see?

- + The ill person has local patches of red swollen skin. Sometimes the rash may have spread over the body. The rash does not necessarily occur at the site of contact with the allergens.
- + There are small or large bumps on the skin. These may merge to form large blisters on the skin.
- + The ill person has itching and a stinging or burning sensation.

### This is what you should do!

Urticaria is very annoying, but usually goes away by itself. In some cases it lasts a few hours, in others a day before the rash disappears completely.

1. Make the area safe
  - + Do not touch the rash. If you do touch the skin, wash your hands and put on disposable gloves.
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.

3. Seek help from a specialist
  - + Refer the ill person to a specialist if:
    - o the reaction is very inhibitive (for example, causes problems sleeping);
    - o a mild rash has not disappeared after a few days.
  - + Call the emergency services on 112 if the rash is accompanied by hoarseness, breathing difficulties (see Swelling of the throat) or signs of anaphylactic shock (see Anaphylactic shock).
4. Administer further first aid
  - + Advise the ill person not to scratch the rash. This will make the itching worse.
  - + Take off your disposable gloves and wash your hands after administering first aid.

If you know what has caused the rash, we recommend avoiding contact with it.

## 2.2 Eczema

### What do you see?

Eczema can manifest in many different forms:

- + The skin is usually red and swollen.
- + The person has itching. There may also be wounds from scratching. This can cause skin infections. In that case, yellow wound fluid or scab formation may appear and small pustules may occur (see an infected wound).
- + Small blisters may appear on the skin.
- + The skin may be dry and flaky.
- + Sometimes the skin is moist.

### This is what you should do!

1. Make the area safe
  - + Do not touch the eczema. If you do touch the skin, wash your hands and put on disposable gloves.
2. Assess the condition of the ill person
  - + Find out what is wrong with the person.
3. Seek help from a specialist
  - + Refer the person to a specialist if:
    - o the reaction has occurred for the first time;
    - o the skin wounds are accompanied by symptoms that may indicate a general infection, for example fever or an unwell feeling (see Infectious diseases);
    - o there are signs of infected skin wounds (see An infected wound).
4. Administer further first aid
  - + Advise the person not to scratch the skin wounds. This will make the itching worse.
  - + Take off your disposable gloves and wash your hands after administering first aid.
  - + If you know what has caused the eczema, we recommend avoiding contact with it.
  - + Keep your nails short and clean. This will help reduce the risk of infected skin wounds.

## 3. Allergic reactions of the respiratory system

### 3.1 Hay fever

#### What do you see?

The person is affected at a certain time of the year (usually in spring and summer) with one or more of the following symptoms:

- + The person has frequent and heavy bouts of sneezing.
- + He may cough or wheeze. Some people have an oppressed feeling and are short of breath.
- + The person's throat may be irritated. The person may feel an itch or pressure in the throat.
- + He sometimes has an itchy, runny or blocked nose.
- + His eyes may be red, itchy or watery. His eyelids may swell up.
- + He may have a headache or be tired and listless.
- + The person may also exhibit other allergic reactions, such as asthma, swelling of the throat or eczema.

#### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
3. Seek help from a specialist
  - + Refer the person to a specialist if it is the first time he has suffered from hay fever.
  - + Call the emergency services on 112 if the hay fever is accompanied by severe breathing difficulties (see Swelling of the throat) or signs of anaphylactic shock (see Anaphylactic shock).
4. Administer further first aid
  - + Advise the person to go indoors. Close the windows and doors to avoid contact with pollen.
  - + If the person does have to go outside, wearing (sun)glasses may help reduce the amount of pollen that gets in the eyes to some extent.
  - + Do not prevent the person from taking medication that has been prescribed by his doctor.

### 3.2 Swelling of the throat

#### What do you see?

- + The person has difficulty breathing, is hoarse and has problems swallowing.
- + He may be wheezing and feel as if he is choking.
- + He may lose consciousness.

#### This is what you should do!

1. Make the area safe
2. Assess the condition of the ill person
  - + Find out what is wrong with the person.
  - + Check the state of consciousness.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist

- + Call the emergency services on 112.
4. Administer further first aid
    - + Help the person find the most comfortable position, and if necessary loosen tight clothing. Some people with a swollen throat find that leaning over is the most comfortable. Others feel better sitting up straight, with elbows and lower arms resting on a table. Others feel better in a half-sitting position (see Shortness of breath; EB<sup>428</sup>, weak recommendation, low quality evidence).
    - + If the swelling is a reaction to an insect sting in the throat, the ill person can suck on some ice or cool the mouth with cold water (see Insect sting). This will reduce the swelling. Only do this if the ill person is conscious. Be alert for possible choking and never let the ill person drink too much (see Choking).
    - + Be alert for signs of possible anaphylactic shock (see Anaphylactic shock).

## 4. Anaphylactic shock

### What do you see?

- + If a person with a known allergy suddenly feels faint and unwell after an insect sting or bite, after contact with plants or after eating food, it is highly likely that he is suffering an anaphylactic shock.
- + The person sometimes has headache and may feel dizzy. This feeling does not disappear within a few minutes.
- + The person's skin is red or pink.
- + The person's face may swell up.
- + He may be wheezing and feel as if he is choking.
- + The reaction is accompanied by skin symptoms (for example, itching or urticaria).
- + The person may feel nauseous, may have diarrhoea and may vomit in some cases.
- + He may feel anxious, drowsy or confused and lose consciousness.

### This is what you should do!

1. Make the area safe
  - + Assess the condition of the person.
  - + Find out what is wrong with the person.
  - + Check the state of consciousness.
  - + Open the airway and check the person's breathing.
2. Seek help from a specialist
  - + Call the emergency services on 112. If you know that the person has suffered an allergic reaction, mention this during the call.
3. Assess the condition of the ill person
4. Administer further first aid
  - + Lie the person down carefully if he shows signs of shock. Do not do this if he is suffering breathing difficulties as a result of shock. In this case, help the person to rest in a comfortable position (for example, sitting or half-sitting).
  - + Someone suffering from a known allergy will sometimes have an auto-injector on him. That is a pre-filled syringe containing adrenaline which he can use in the case of an acute allergic

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<sup>428</sup> ES Dyspnea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

## Allergies

reaction. This injection may be life-saving. Do not prevent the person from taking his medication or injecting himself.

- + Check the person's consciousness and breathing regularly.

### **Summaries made for topics for which no evidence could be identified:**

- Swollen throat due to insect bite – Ice or cold water: p812 in summary book

# Infectious diseases

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# 1. Fever

## What do you see?

- + The ill person is cold, but feels warm.
- + He is sweating, but has goose bumps. He may shiver and his teeth may chatter.
- + He feels unwell and may have a headache.
- + He may have muscle ache.
- + Due to the intense sweating, he may show signs of dehydration (see Dehydration).
- + In some cases he may suffer convulsions brought on by the fever (see Febrile seizures).

## This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB <sup>429</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the fever symptoms persist (longer than three days);
    - o the fever occurs again after a few fever-free days;
    - o there are additional symptoms which are of concern;
    - o the ill person is a baby (between 1 and 3 months) with a temperature higher than 38.5 °C;
    - o you are in doubt.
4. Administer further first aid
  - + Take the ill person's temperature (EB <sup>430,431,432,433</sup>, weak recommendation, low to very low quality evidence).
  - + Let the ill person rest, with no further exertions. In the case of light to moderate fever, complete bed rest is not necessary. Get the ill person to wear light clothing.
  - + Make sure the ill person drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
  - + In many cases, medication is not required. We only advise giving a simple anti-pyretic in the case of a fever higher than 38.5 °C, if the ill person so wishes (for example, if he really does not feel good). If the ill person can tolerate the fever, there is no real need to treat (EB <sup>434</sup>, strong recommendation, moderate quality evidence).

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<sup>429</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>430</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>431</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>432</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>433</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>434</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

Children are best treated with a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.

- + Administer first aid in the event of febrile seizures if necessary (see Febrile seizures).
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>435</sup>, strong recommendation, low quality evidence).
- + It is not necessary to keep the ill person extra warm, even if he feels cold. So do not recommend that he puts on a thick jumper or cover him with a thick quilt if he does not want to.
- + You can cool down someone with a fever, especially a child, by undressing him and dabbing him with luke-warm water or giving him a luke-warm bath. Do not do this if the child gets upset. Do not use cold water to dab or spray the ill person. This has the opposite effect. The skin's blood vessels will contract and the body will be less able to release heat. The cold water also causes shivers, which causes more heat to be produced (EB<sup>436,437</sup>, weak recommendation, low quality evidence).

## 2. Mononucleosis

### What do you see?

- + This disease is not usually accompanied by any symptoms. The ill person may have felt tired for a long period of time, but that is not the case for all those affected.
- + The first signs of the disease are usually vague: a mild fever, headache or lack of appetite.
- + The fatigue becomes more pronounced at a later stage. The ill person will feel exhausted after the slightest exertion.
- + The glands in the neck, armpits and groin are swollen. He often has a very sore throat. The liver and spleen may also be swollen. Sometimes they are so swollen that there is a risk of serious internal bleeding if they are hit or bashed in that area. As a consequence, sport is often not recommended for those suffering from mononucleosis. If the liver is infected, the ill person will exhibit signs of jaundice.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>435</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
3. Seek help from a specialist
  - + Seek help from a specialist if you notice the above symptoms
4. Administer further first aid

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<sup>435</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>436</sup> ES Fever – Physical methods: p843 in summary book: There is limited evidence neither in favour of sponging nor placebo. There is limited evidence neither in favour of tepid water sponging nor paracetamol. There is limited evidence in favour of paracetamol compared to cold water sponging.

<sup>437</sup> ES Fever – Physical methods + paracetamol: p848 in summary book: There is limited evidence in favour of sponging with tepid water combined with paracetamol for the resolution of fever. There is limited evidence in favour of paracetamol only for the outcome adverse events/discomfort.

- + Take the temperature (EB<sup>438,439,440,441</sup>, weak recommendation, low to very low quality evidence)
- + Try to bring down the fever. Consider giving the ill person a simple anti-pyretic, if the temperature is 38.5 °C or more (see Fever) (EB<sup>442</sup>, strong recommendation, moderate quality evidence).

Children are best treated with a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.

- + Make sure the ill person drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>443</sup>, strong recommendation, low quality evidence).

## 3. Flu

### What do you see?

- + The ill person feels unwell, has no appetite and often feels weak.
- + He has a fever.
- + He may have a sore throat and a headache.
- + He sometimes suffers from watery eyes, and a runny or blocked nose.
- + He may also have a cough.
- + In some cases the ill person has muscle pain.
- + The ill person may sweat profusely.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>443</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
3. Seek help from a specialist
  - + Seek help from a specialist if:
    - o the ill person is older than 65 years;
    - o he has a chronic illness;

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<sup>438</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>439</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>440</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>441</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>442</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

<sup>443</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

- he has an impaired immune system for other reasons (for example, seropositive, has had a bone marrow transplantation, is a cancer patient);
  - the ill person is pregnant.
4. Administer further first aid
- + Take the temperature (EB<sup>444, 445, 446, 447</sup>, weak recommendation, low to very low quality evidence).
  - + Try to bring down the fever. Consider giving the ill person a simple anti-pyretic, if the temperature is 38.5 °C or more (see Fever) (EB<sup>448</sup>, strong recommendation, moderate quality evidence).  
Children are best treated with a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.
  - + Make sure the ill person drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>449</sup>, strong recommendation, low quality evidence).

## Preventing flu

- + Wash your hands thoroughly with water and soap or disinfect them if you have been in contact with someone who has flu (EB<sup>449</sup>, strong recommendation, low quality evidence).
- + Avoid touching your eyes, nose or mouth if you may have touched infected objects (handrails on public transport, door handles ...).
- + When you sneeze or cough, tiny droplets are released into the air. These droplets from someone who has flu are extremely infectious when inhaled. You can drastically reduce the risk of infection by sneezing or coughing into a tissue (or part of your clothing, for instance your sleeve) held over your mouth or by sneezing into your elbow (EB<sup>450</sup>, weak recommendation, very low quality evidence).
- + It is also important to regularly clean and air the area inhabited by someone suffering from flu.
- + In the case of a flu epidemic, it is recommended to wear a face mask to avoid becoming infected with the virus. If this is necessary, you will be informed by the public health authorities.
- + Those in high-risk groups should get a flu vaccination. This is best discussed with a doctor.  
The flu vaccination is recommended for:
  - people over 65 years;

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<sup>444</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>445</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>446</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>447</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>448</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

<sup>449</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>450</sup> Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence neither in favour of the use of tissues or handkerchiefs nor no use of tissues and handkerchiefs. The expert panel recommends the use of a handkerchief or towel.

- people who live in an institution;
- people with certain chronic diseases (heart, lung, kidney or liver diseases, metabolic diseases and diabetes);
- people with impaired immunity, as a result of medication or otherwise;
- children and young people between the ages of 6 months and 18 years who are being treated long term with acetylsalicylic acid;
- pregnant women;
- people working in a care institute.

## 4. Sexually transmitted diseases (STDs)

### 4.1 What is it?

#### What do you see?

- + There is a coloured or strong smelling excretion from the vagina or penis.
- + There are blisters, warts or ulcers on the genitals, anus or mouth.
- + There is itching in the pubic hair, on the tip of the penis, the labia or the anus.
- + Urinating or having sex is painful.
- + The ill person has pain in the stomach, lower abdomen or testicles.
- + In women there may be changes in the menstruation cycle (for example, bleeding between periods).
- + The glands in the groin area may be swollen.
- + In women especially, sexually transmitted diseases present with no clear symptoms.

#### This is what you should do!

As a first aider there are not many treatments you can administer in the case of suspected STD. The ill person needs specialized help.

#### Preventing STDs

- + Practise safe sex. Use a condom if possible. There are condoms available for men and women. Make sure you use the condom correctly. If you do not, then it is not a reliable form of protection. You can only use a condom once. If you practise anal sex, use an extra strong condom and use a water-based lubricant (EB<sup>451</sup>, strong recommendation, low quality evidence).
- + Only have sex without a condom if you have a long-term partner and if you are sure that neither you nor your partner has an STD. If you have sex with a long-term partner that does not have an STD, and if you never have sex with anyone else, there is very little chance of you catching an STD. If you do change partner regularly, you will risk becoming infected.
- + Drink moderate amounts of alcohol: most unplanned and unsafe sex takes place after excessive alcohol consumption (EB<sup>452</sup>, strong recommendation, moderate quality evidence).

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<sup>451</sup> ES Sexually transmitted diseases – Condoms: p851 in summary book: There is limited evidence in favour of condom use.

<sup>452</sup> ES Sexually transmitted diseases – Alcohol: p853 in summary book: There is evidence in favour of no alcohol use.

- + Make sure that sperm and (menstrual blood) does not come into contact with wounds or ulcers on your skin or in your mouth.
- + STDs can also be transmitted in other ways (see Preventing HIV infection).

## 4.2 HIV and AIDS

### What do you see?

Someone who is seropositive does not suffer any notable symptoms. Only after a long period of infection (up to years later) does the ill person experience all kinds of banal infections, at which point the disease is defined as AIDS. The following symptoms can then present:

- + The ill person becomes extremely tired.
- + He experiences unexplained weight loss.
- + He suffers from sudden high fever and may sweat profusely at night.
- + The lymph nodes may be swollen.
- + The ill person suffers from all kinds of infections, for example, long-term diarrhoea, repeated colds, infected gums.
- + He is often short of breath.
- + The ill person will eventually die from the combination of all these infections.

### This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected HIV. The ill person needs specialized help.

- + For someone who has just put themselves at risk, less than a day before for instance, so-called PEP treatment can be helpful. PEP stands for Post Exposure Prophylaxis and is a preventive treatment with HIV-blockers to prevent an infection with the virus. PEP can for example be used if there has been an accident involving a needle that has been used by a seropositive person or in the case of unsafe sex with someone who has a high risk of HIV (for example, someone who is seropositive or a prostitute).
- + Those who are seropositive should have regular blood tests. If necessary, treatment can be started to slow down the progression of the disease and alleviate the symptoms as much as possible.
- + Practise good hand hygiene.

### Preventing HIV

- + You can avoid being infected with HIV during sex in the same way as you avoid contracting STDs (see Preventing STDs).
- + You can also avoid HIV infection through other contact. Bear in mind the following tips:
  - o In Belgium giving and receiving blood is a safe procedure. The safety of a blood transfusion can be guaranteed by preventing an infection of the population, refusing high-risk donors and carrying out sensitive lab tests that can trace blood-transmittable viruses (such as HIV, hepatitis B or C). It is precisely for this reason that blood transfusion is not safe everywhere. Avoid having a blood transfusion abroad. Consider repatriation if possible.
  - o If you have to take medication while travelling, ask for drugs that you can swallow or drink. If this is not possible, always check that sterile, new needles and syringes are used.

- Intravenous drug use is a risk to health and will cause infections if there is repeated and communal use of syringes and needles. Never use someone else's needles or syringes when taking drugs (EB<sup>453</sup>, strong recommendation, very low quality evidence).
- A seropositive woman can give birth to a seropositive baby. If she wants children, she should consult a specialist.
- + As a first aider, you can avoid infection from HIV as follows:
  - Avoid direct contact with other people's blood, sperm or vaginal fluids. That applies to any injured or ill person. Always wash your hands and wear disposable gloves if there is a chance that you will come into contact with the blood or other bodily fluids of the injured or ill person (EB<sup>454</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence). Cover any wounds, on your hands for instance (for example with a plaster).
  - If you do come into contact with potentially infectious bodily fluids, wash your hands thoroughly with soap and water. Use hand alcohol afterwards. In the event of splashes in your eye, rinse your eyes with plenty of water. Consult a specialist as quickly as possible if there is a risk of infection.
  - Consult a specialist if you have accidentally been pricked with a needle. A needle accident is a situation in which you have been accidentally pricked with a needle that you have previously used on an injured person.
  - Use a pocket mask for ventilating an injured person who has blood in his mouth (EB<sup>455</sup>, weak recommendation, low quality evidence).

## 4.3 Chlamydia

### What do you see?

Those suffering from chlamydia often have few or no symptoms.

- + Infected women sometimes have more or abnormal vaginal discharge, blood loss between periods, a different menstrual pattern, lower abdominal pain, pain or blood loss when having sex ...
- + Infected men may experience translucent to white discharge from the penis, pain or a burning feeling while urinating or having sex, and pain in the testicles.

### This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected chlamydia. The ill person needs specialized help.

## 4.4 Gonorrhoea

### What do you see?

Gonorrhoea does not always present with clear symptoms. Men who are infected with gonorrhoea almost always have symptoms. In women, there are rarely symptoms.

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<sup>453</sup> ES Aids – Sterile needles: p855 in summary book: There is limited evidence in favour of needle and syringe programmes (i.e. use of sterile needles).

<sup>454</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>455</sup> ERC 2015 – Section 2: Adult Basic Life Support and automated external defibrillation: Manikin studies indicate that the quality of CPR is superior when a pocket mask is used compared to a bag-valve mask or simple face shield.

- + Infected men may suffer from abundant, yellow-green discharge from the penis. He may experience sharp pain when urinating and lose blood via the penis.
- + Infected women may notice a pus-like green discharge from the vagina. There may also be pain and blood loss when having sex.

### This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected gonorrhoea. The ill person needs specialized help.

## 4.5 Syphilis

### What do you see?

**The syphilis infection comprises three stages:**

- + First a **painless ulcer** appears at the infected site (genitals, anus or mouth). This appears on average three weeks after the infection and remains for approximately four weeks. The ulcer will disappear without treatment.
- + Thereafter the bacteria will enter the bloodstream. This occurs seven to ten weeks after the infection. This often leads to **fever, headache, bone pain, inflammation of the lymph nodes or even hair loss**. This phase is characterised by a **pink skin rash** on the torso, soles of the feet or palms of the hand. These symptoms also disappear without treatment.
- + Only years later does the final phase occur, in which the **heart, spinal cord, bones or brains are affected**. This phase occurs very infrequently in our country. Syphilis is usually discovered before the infection reaches this stage.

**The symptoms of syphilis are not always easy to spot.** This is because the characteristic ulcer can also occur in a bodily cavity, such as the vagina, anus or throat. A blood test will confirm the diagnosis.

### This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected syphilis. The ill person needs specialized help.

## 5. Tuberculosis

### What do you see?

- + In the case of lung tuberculosis, the ill person has a chronic cough. In some cases he coughs up blood.
- + The general condition of the ill person deteriorates: he is very tired, may have fever, has no appetite, and thus loses weight.
- + He may suffer from night sweats.

### This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected tuberculosis. The ill person needs specialist help.

- + Tuberculosis can be treated, on condition that medication is administered early on and the doctor's instructions are followed closely.
- + Advise the ill person always to cover his mouth with a handkerchief or towel when coughing or sneezing (EB<sup>456</sup>, weak recommendation, very low quality evidence).
- + People from his wider circle of acquaintances must also be checked for the disease.
- + Practise good hand hygiene (EB<sup>457</sup>, strong recommendation, low quality evidence).

## 6. Hepatitis

### What do you see?

Initially, the symptoms of a liver infection are not specific: the person feels unwell and tired, has no appetite, may feel nauseous, and may vomit. In most cases he will lose weight. However, these symptoms are the same as for many diseases.

- + The injured person may have stomachache. His liver region is swollen and painful.
- + After a while, he may suffer from jaundice (icterus). This means that various parts of his body will turn yellow: the skin and the mucosa (for example, the whites of the eye). The urine is dark, while the stools become lighter in colour. Although these symptoms are quite specific for a liver infection, they do not always occur.
- + There may be an itchy rash.
- + In the case of **hepatitis A**, young children usually manifest only mild symptoms or none at all. The older the child, the more symptoms he will suffer. In adults the disease can be more serious, with symptoms lasting for weeks and months.
- + Infection with **hepatitis B** does not usually present with symptoms. In some cases the ill person may develop an acute liver infection. The disease can also be chronic (longlasting). Years later the ill person may develop liver cirrhosis. Liver cancer is also a possible complication.
- + Most infections with **hepatitis C** go unnoticed because the symptoms are not specific (fatigue, lethargy ...) and the disease evolves very slowly. In some cases the symptoms are followed by jaundice, but certainly not always. Liver cirrhosis only occurs after twenty years. Liver tumours can occur even ten years later.

### This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected hepatitis. The ill person needs specialized help. He can also ask for specialized advice about how to prevent hepatitis (namely, vaccination).

### Preventing hepatitis

#### Hepatitis A

- + Respect the elementary hygiene rules when travelling in an area with poor sanitary facilities: wash your hands (EB<sup>457</sup>, strong recommendation, low quality evidence), boil water, sterilise it via

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<sup>456</sup> Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence neither in favour of the use of tissues or handkerchiefs nor no use of tissues and handkerchiefs. Expert panel recommends the use of handkerchief or towel.

<sup>457</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing.

filtration or chlorine tablets (EB<sup>458</sup>, strong recommendation, moderate quality evidence) or drink bottled water (EB<sup>459</sup>, weak recommendation, very low quality evidence)

- + Avoid swallowing any water when swimming in open water (EB<sup>460</sup>, weak recommendation, very low quality evidence).
- + It is possible to get vaccinated against hepatitis A. It is especially recommended for those travelling to countries with poor hygiene. Ask your doctor for advice well in advance of travelling to a risk area. This is because it takes time for a vaccine to work. Vaccination may also be an option for those who are at high risk of being infected:  
healthcare workers, those in contact with hepatitis A patients or those with impaired immunity. Ask a doctor for advice.

### Hepatitis B

- + Protect yourself against infection with the hepatitis B virus by practising safe sex (see Preventing STDs) (EB<sup>461</sup>, strong recommendation, low quality evidence).
- + Avoid contact with blood or other bodily fluids (see Preventing an HIV infection).
- + Vaccination against hepatitis B is recommended by the Belgian National Health Council for all babies and adolescents. The vaccine can also be useful for those at a high risk of contracting the disease: healthcare workers, those in contact with someone who is a carrier of the virus, people with impaired immunity or those travelling to high-risk areas. Ask a doctor for advice.

### Hepatitis C

- + There is no vaccine against hepatitis C.
- + Avoid contact with blood or other bodily fluids of other people (see Preventing an HIV infection).

## 7. Meningitis

### What do you see?

- + In some cases the ill person has experienced flu-like symptoms or an ear or sinus infection a few days previously. The symptoms of meningitis can also be accompanied by other signs of disease, depending on the microorganism responsible for the infection.
- + The ill person feels drowsy and lethargic, is sleepy and sometimes confused. His condition deteriorates fast.
- + He suddenly has a very high fever and may have convulsions.
- + He has a severe headache and is sometimes oversensitive to light and noise.
- + His neck feels stiff: the ill person can no longer lower his chin to his chest. This is a good way to check if it could be meningitis.
- + He may feel sick and vomit.

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<sup>458</sup> ES Diarrhoea – Water purification: p330 in summary book: There is evidence in favour of chlorination, ceramic, sand or Lifestraw® filtration and flocculation and disinfection to purify water

<sup>459</sup> ES Diarrhoea & dehydration – drinking and swimming: p377 in summary book: There is conflicting evidence concerning drinking tap water. Expert opinion: Do not use tap water if there are poor hygiene conditions.

<sup>460</sup> ES Diarrhoea & dehydration – drinking and swimming: p377 in summary book: It was shown that the following risk factors resulted in a statistically significant increased risk of Cryptosporidium/Giardia infection: exposure to any recreational water, recreational fresh water contact, and swallowed water while swimming.

<sup>461</sup> ES Sexually transmitted diseases – Condoms: p851 in summary book: There is limited evidence in favour of condom use.

- + You may observe red or purple spots on the skin. If you press a glass to these spots, you will observe that the colour does not disappear.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>462</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill person
  - + Find out what is wrong with the ill person.
3. Seek help from a specialist
  - + Seek help from a specialist.
  - + Call the emergency services on 112 if the ill person's condition deteriorates fast or if he starts losing consciousness.
4. Administer further first aid
  - + Take the temperature (EB<sup>463,464,465,466</sup>, weak recommendation, low to very low quality evidence)
  - + Let the ill person do no exertions.
  - + Make sure the ill person drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
  - + Try to bring down the fever. Consider giving the ill person a simple anti-pyretic, if the temperature is 38.5 °C or more (see Fever) (EB<sup>467</sup>, strong recommendation, moderate quality evidence).  
Children are best treated with a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.
  - + Keep the ill person in bed, isolated from other people (children, family members).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>468</sup>, strong recommendation, low quality evidence).

### Preventing meningitis

- + It is possible to get vaccinated against some forms of bacterial meningitis. People travelling should consult a doctor beforehand. Vaccination is strongly recommended in young children (younger than 2 years). Ask your doctor for advice on this.

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<sup>462</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>463</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>464</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>465</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>466</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>467</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

<sup>468</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

- + In some cases preventive antibiotics are given to people who have been in close contact with the ill person (housemates, friends at school, caregivers, people who sleep in the same room or eat together with the ill person). Ask your doctor for advice on this.

## 8. Lyme's disease

### What do you see?

There are three stages. Your observations will depend on what stage the ill person is in.

- + Stage one (3 days to 3 weeks after the tick bite):
  - o The ill person has a red ring on the skin that expands from the site of the bite, with a paler patch in the middle.
  - o There may be skin wounds on other parts of the body.
- + Stage two (weeks to months after the tick bite):
  - o The ill person has flu-like symptoms.
  - o He complains about severe fatigue.
  - o He may develop meningitis.
  - o Facial paralysis may occur.
  - o The ill person has joint and muscle pain.
  - o He may have heart problems.
- + Stage three (months to years after the tick bite):
  - o The ill person may develop a chronic joint disorder.
  - o He may suffer from chronic nerve symptoms.
  - o He may have a chronic skin disorder.

### This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected Lyme's disease. The ill person needs specialist help.

## 9. Früh Sommer Meningo Encephalitis (FSME)

### What do you see?

There are two phases. Your observations will depend on what stage the ill person is in.

- + Phase one: the ill person suffers from flu-like symptoms, such as fever and headache.
- + Phase two: after phase one, a symptom-free period follows, which in approximately 10% of cases is followed by a serious infection of the brain and meninges. The ill person suffers from high fever, headache and symptoms of paralysis. In rare cases there can be lasting damage to the nervous system (such as paralysis or deafness) or the ill person may die.

### This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected Früh Sommer Meningo Encephalitis. The ill person needs specialized help.

# 10. Malaria

## What do you see?

- + Initially the ill person has flu-like symptoms.
- + Repeat attacks of fever are also typical for malaria.

## This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected malaria. The ill person must consult a specialist if he has a fever during or within three months of a journey to a high-risk area. Advise the ill person to mention any tropical travel to the doctor.

- + If malaria is recognized in time, it is treatable. There is no risk of recurring attacks in this case.
- + Those infected with malaria can die as a result of the infection. This will happen if the infection is not treated in time.

## Preventing malaria

- + Enquire in advance if malaria occurs in the area where you will be travelling or working. You can get this information from a general practitioner or the Belgian Institute for Tropical Medicine.
- + If you go to a risk area for malaria:
  - o Try to avoid being stung by insects or bitten by mosquitoes (see Preventing an insect sting and Preventing a mosquito bite).
  - o Preferably sleep in a room that with windows and vents that are covered with mosquito screens. The opening for the air conditioning should also be protected with screens. Airconditioning reduces the aggressive behaviour of the mosquitos but does not always stop them from biting. Staying in a room with air-conditioning does not mean that you should not take other measures.
  - o Mosquitoes are attracted by light. When sitting outside at night, choose a place away from lights.
  - o Special candles (containing linalool, geraniol or citronella) excrete a smell when burning that keeps mosquitoes away. Only use these candles outside. In order to be effective, the candle must contain at least 5% of the active substance (EB<sup>469</sup>, weak recommendation, low quality evidence).
  - o To avoid being bitten by mosquitos, wear clothes impregnated with an insect repellent (for example, permethrin). You can do this yourself by submerging your clothes in a solution of this substance and letting them dry thoroughly. If possible, wear long trousers and long sleeves (EB<sup>470</sup>, weak recommendation, very low quality evidence).
  - o Stay away from areas where there is stagnant water (swamp), especially in the evening and at night. If that's not possible, wear long-sleeved tops and long trousers if there are a lot of mosquitos around.
  - o Hang a mosquito net above your bed, if possible one impregnated with an insect repellent (for example, permethrin or deltamethrin). These are substances that repel and

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<sup>469</sup> ES Mosquito bite – Oil candles: p548 in summary book: There is limited evidence in favour of 5% linalool/geraniol/citronella candles. There is limited evidence neither in favour of using 3% citronella candles nor using them.

<sup>470</sup> ES Mosquito bite – Impregnated clothing: p551 in summary book: There is limited evidence in favour of wearing impregnated clothes.

kill mosquitoes. Hang it just above the bed and tuck the edges under the mattress. Do not lie against it (EB<sup>471</sup>, strong recommendation, moderate quality evidence).

- Use a spray containing DEET (diethyltoluamide), icaridin and paramenthanediol. These sprays are most effective (EB<sup>472</sup>, weak recommendation, low quality evidence). Apply insect spray at the earliest one hour after applying sun cream. Insect sprays always reduce the efficacy of sunscreen (EB<sup>473</sup>, weak recommendation, low quality evidence).
  - To reduce the risk further, there are also antimalarial medicines you can take before travelling. Ask for more information from a general practitioner or the Belgian Institute for Tropical Medicine.
- + Electronic insect-repellents do not appear to be effective (EB<sup>474</sup>, strong recommendation, moderate quality evidence). The same applies to anti-mosquito spirals (EB<sup>475</sup>, weak recommendation, low quality evidence).
  - + For more information, consult the website of the Institute for Tropical Medicine on [www.itg.be](http://www.itg.be).

## 11. Dengue

### What do you see?

- + The ill person has severe flu-like symptoms:
  - He has a high fever.
  - He may have a headache.
  - He may feel nauseous and vomit.
  - He has muscle and joint pain.
- + These symptoms can be accompanied by small bleeds in the conjunctival membrane, blood loss from the nose (nosebleed) and bruises.

### This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected dengue. The ill person needs specialized help.

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<sup>471</sup> ES Mosquito bite – Bednets: p555 in summary book: There is evidence in favour of using treated or untreated bednets.

<sup>472</sup> ES Mosquito bite – Topical oils or repellents: p542 in summary book: There is limited evidence in favour of DEET, icaridin and para-menthane diol.

<sup>473</sup> ES Malaria – Sunscreen + Insect repellent: p860 in summary book: There is limited evidence in favour of sunscreen alone for the efficacy of sunscreen as an outcome. There is limited evidence neither in favour of combined use of insect repellent and sunscreen nor insect repellent alone for the efficacy of the insect repellent as an outcome.

<sup>474</sup> ES Mosquito bite – Electronic mosquito repellents: see appendix 4: There is limited evidence neither in favour of using electronic mosquito repellents nor not using them.

<sup>475</sup> ES Mosquito bite – Mosquito coils: p557 in summary book: There is limited evidence neither in favour of a metofluthrin coil nor no coil. There is limited evidence in favour of using transfluthrin coils. Expert opinion: for one type of coil there was a proven effect, but not for another. From a teaching perspective, it is therefore not recommended to advise the use of mosquito coils.

## 12. Rabies

### What do you see?

- + The ill person has been bitten by a dog or a wild animal.
- + In the early stages of the disease the ill person has a fever, feels ill and has a headache.
- + The ill person has a reduced appetite, a sore throat and feels nauseous.
- + The ill person is irritable and is often oversensitive to light and noise.
- + He has an abnormal sensation in the body part that has been bitten: sometimes a cold sensation, then itching or pain.
- + The muscles slowly cramp up: the desire to drink something can incite cramp in the swallowing muscles and respiratory muscles.
- + Symptoms of paralysis present everywhere. When the jaw muscles paralyse, the ill person will start dribbling.
- + Eventually the ill person will go into a coma and die.

### This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected rabies. The ill person needs specialized help. The treatment should start as soon as possible after the infection, even before the first symptoms appear.

If possible, quarantine an animal that you suspect of having rabies and that has bitten someone, and have it checked over by a vet.

## 13. Cat scratch disease

### What do you see?

- + The ill person has a transitory fever.
- + He has a headache.
- + You may observe skin wounds at the site of the scratch or bite.

Two weeks afterwards there may be large and painful swelling of (a) lymph node(s) in one or more places, for instance in the neck, armpits or elbow crease. The skin feels warm at that site and looks red. The swelling is accompanied by pus formation. A scratch or bite in the vicinity of the eye may give rise to a serious eye infection.

In older people or people who have a compromised immune system (for example, AIDS patients) the disease may be much more serious. The ill person has a high fever and extensive skin wounds. The spleen and liver may also be affected. In the worst-case scenario, the disease may be fatal.

### This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected cat scratch disease. The ill person needs specialized help.

## 14. Diphtheria

### What do you see?

- + In the early stages of the disease the ill person has flu-like symptoms (fever, sweating, a headache).
- + The ill person has a sore throat and has difficulty swallowing.
- + He will frequently have a runny nose. This may develop from translucent fluid to a bloody discharge with crusts in the nose.
- + The injured person may feel nauseous and vomit.
- + He has bad breath.
- + In the case of diphtheria in the throat, thick grey membranes cover the throat region. This will make it difficult for the ill person to breathe. The ill person then has a typical barking cough and wheezing. The neck may be very swollen.

### This is what you should do!

As a first aider there are not many treatments that you can administer to a person with suspected diphtheria. The ill person needs specialized help. He can also ask for specialist advice about prevention (namely, vaccination).

People from his wider circle of acquaintances must also be checked for the disease.

## 15. Childhood diseases

### 15.1 Measles (morbilli)

#### What do you see?

- + The ill child has a high fever.
- + He has a runny nose, may have a cough and watery eyes.
- + Red spots with very small white points are visible on the oral mucosa.
- + Reddish brown, slightly swollen spots appear on the forehead, which spread downwards, eventually covering the entire body.

#### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB <sup>476</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill child
  - + Find out what is wrong with the ill child.
3. Seek help from a specialist
  - + Seek help from a specialist.
4. Administer further first aid

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<sup>476</sup> Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

- + Take the temperature (EB<sup>477, 478, 479, 480</sup>, weak recommendation, low to very low quality evidence)
- + Do not let the ill child undertake any exertion.
- + Make sure the ill child drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
- + Try to bring down the fever. Consider giving the ill child a simple anti-pyretic, if the temperature is 38.5 °C or more (EB<sup>481</sup>, strong recommendation, moderate quality evidence). This is best given in the form of a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.
- + Keep the ill child in bed, isolated from other people (children, family members).
- + Advise the ill child always to cover his mouth with a handkerchief or towel when coughing or sneezing (EB<sup>482</sup>, weak recommendation, very low quality evidence).
- + If the sick child has irritated eyes, it may help to darken the room and dab the eyes with luke-warm water.
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>483</sup>, strong recommendation, low quality evidence).

## 15.2 Scarlet fever

### What do you see?

- + The ill child has a fever which rises to 39 °C and more within a few days. After 5 to 6 days the body temperature will fall back down to normal levels.
- + He may have a headache.
- + He may feel nauseous and vomit.
- + The throat and tonsils are red and inflamed.
- + The tongue is bright red and looks like raspberries. We sometimes talk of a 'raspberry' or 'strawberry' tongue.
- + A red, pointed rash appears, mainly on the cheeks, neck, armpits and groin area. If you press on the rash, it disappears. The area around the mouth remains pale. We sometime use the term 'anaesthetic mask' (strikingly red cheeks, with a white triangle around the mouth and under the nose).
- + The skin feels like sandpaper. After the disease has run its course, the skin on the palms of the hands and soles of the feet may peel.

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<sup>477</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>478</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>479</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>480</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>481</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

<sup>482</sup> Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence neither in favour of the use of tissues nor handkerchiefs or no use of tissues and handkerchiefs. The expert panel recommends the use of handkerchief or towel.

<sup>483</sup> Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

## This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>483</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill child
  - + Find out what is wrong with the ill child.
3. Seek help from a specialist
  - + Seek help from a specialist.
4. Administer further first aid
  - + Take the temperature (EB<sup>484, 485, 486, 487</sup>, weak recommendation, low to very low quality evidence).
  - + Do not let the ill child undertake any exertion.
  - + Make sure the ill child drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
  - + Try to bring down the fever. Consider giving the ill child a simple anti-pyretic, if the temperature is 38.5 °C or more (EB<sup>488</sup>, strong recommendation, moderate quality evidence). This is best given in the form of a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.
  - + Keep the ill child in bed, isolated from other people (children, family members).
  - + Advise the ill child always to cover his mouth with a handkerchief or towel when coughing or sneezing (EB<sup>489</sup>, weak recommendation, very low quality evidence).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>490</sup>, strong recommendation, low quality evidence).

## 15.3 German measles (Rubella)

### What do you see?

- + German measles often starts out as a cold.
- + The ill child has a mild fever. This rarely exceeds 38 °C.
- + The lymph nodes are swollen for approximately one week. You can feel this as round swellings behind the ears, under the jaw or in the neck.
- + A day later pink or light red spots will sometimes appear, and then disappear three days later.

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<sup>484</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>485</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>486</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>487</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>488</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

<sup>489</sup> Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence neither in favour of the use of tissues nor handkerchiefs or no use of tissues and handkerchiefs. The expert panel recommends the use of handkerchief or towel.

<sup>490</sup> Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

## This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>491</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill child
  - + Find out what is wrong with the ill child.
3. Seek help from a specialist
  - + Seek help from a specialist.
4. Administer further first aid
  - + Take the temperature (EB<sup>492, 493, 494, 495</sup>, weak recommendation, low to very low quality evidence).
  - + Do not let the ill child undertake any serious exertion.
  - + Make sure the ill child drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
  - + Try to bring down the fever. Consider giving the ill child a simple anti-pyretic, if the temperature is 38.5 °C or more (EB<sup>496</sup>, strong recommendation, moderate quality evidence). This is best given in the form of a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.
  - + Keep the ill child in bed, isolated from other people (children, family members).
  - + Advise the ill child always to cover his mouth with a handkerchief or towel when coughing or sneezing (EB<sup>497</sup>, weak recommendation, very low quality evidence).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>491</sup>, strong recommendation, low quality evidence).

## 15.4 Fifth disease (erythema infectiosum)

### What do you see?

- + Fifth disease often starts out as a cold.
- + There may be a mild fever, but the child usually does not feel ill or only slightly.
- + For a few days, there is a serious, red rash on the face. The cheeks may feel warm to the touch. We call this 'apple cheeks'. The area around the mouth remains pale.

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<sup>491</sup> Hygienic measures - Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>492</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>493</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>494</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>495</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>496</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

<sup>497</sup> Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence neither in favour of the use of tissues or handkerchiefs nor no use of tissues and handkerchiefs. The expert panel recommends the use of handkerchief or towel.

- + Initially the child only has spots on the face, which then spread to the upper areas of arms and legs, and then to the extremities of limbs, bottom and torso.
- + In some cases there are joint complaints in the wrists, back and knees.
- + The skin rash may be present for several days and may sometimes flare up when the disease has run its course, under the effect of sunlight, extreme temperatures, exertion or emotions.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>498</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill child
  - + Find out what is wrong with the ill child.
3. Seek help from a specialist
  - + Seek help from a specialist.
4. Administer further first aid
  - + Take the temperature (EB<sup>499, 500, 501, 502</sup>, weak recommendation, low to very low quality evidence).
  - + Do not let the ill child undertake any serious exertion.
  - + Make sure the ill child drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
  - + Try to bring down the fever. Consider giving the ill child a simple anti-pyretic, if the temperature is 38.5 °C or more (EB<sup>503</sup>, strong recommendation, moderate quality evidence). This is best given in the form of a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.
  - + Keep the ill child in bed, isolated from other people (children, family members).
  - + Advise the ill child always to cover his mouth with a handkerchief or towel when coughing or sneezing (EB<sup>504</sup>, weak recommendation, very low quality evidence)
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>498</sup>, strong recommendation, low quality evidence).

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<sup>498</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>499</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>500</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>501</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>502</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>503</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol. <sup>509</sup> Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence either in favour of the use of tissues or handkerchiefs or no use of tissues and handkerchiefs. Expert panel recommends the use of handkerchief or towel.

<sup>504</sup> ES Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence either in favour of the use of tissues or handkerchiefs or no use of tissues and handkerchiefs. Expert panel recommends the use of handkerchief or towel.

## 15.5 Sixth disease (exanthema subitum or roseola infantum)

### What do you see?

- + The ill child has a sudden high fever (above 39 °C) that lasts 3 to 4 days.
- + The child is irritable, but does not appear to be ill.
- + Once the fever has disappeared, a skin rash similar to that for German measles appears. After 1 to 2 days (sometimes even after a few hours) the rash disappears.
- + In some cases the rash is accompanied by other symptoms such as sore throat, earache or enlarged lymph glands in the neck region.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>505</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill child
  - + Find out what is wrong with the ill child.
3. Seek help from a specialist
  - + Seek help from a specialist.
4. Administer further first aid
  - + Take the temperature (EB<sup>506, 507, 508, 509</sup>, weak recommendation, low to very low quality evidence).
  - + Do not let the ill child undertake any serious exertion.
  - + Make sure the ill child drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
  - + Try to bring down the fever. Consider giving the ill child a simple anti-pyretic, if the temperature is 38.5 °C or more (EB<sup>510</sup>, strong recommendation, moderate quality evidence). This is best given in the form of a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.
  - + Keep the ill child in bed, isolated from other people (children, family members).

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<sup>505</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>506</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>507</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>508</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>509</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>510</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

- + Advise the ill child always to cover his mouth with a handkerchief or towel when coughing or sneezing (EB<sup>511</sup>, weak recommendation, very low quality evidence).
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>512</sup>, strong recommendation, low quality evidence).

## 15.6 Chicken pox (varicella)

### What do you see?

- + The sick child usually has a fever.
- + He may sometimes have a headache, feel unwell or have a reduced appetite.
- + There are red spots on the skin that turn into fluid-filled blisters. These blisters itch badly and are easily scratched open. They appear more often on the torso and face than on the limbs.
- + Intense scratching can lead to infected skin wounds. This will prolong the fever and the skin wounds will become more red and painful.
- + Afterwards scabs will form. There will occasionally be permanent scarring.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>512</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill child
  - + Find out what is wrong with the ill child.
3. Seek help from a specialist
  - + Seek help from a specialist. If the itching is really severe, a doctor may prescribe medication to alleviate this.
4. Administer further first aid
  - + Take the temperature (EB<sup>513, 514, 515, 516</sup>, weak recommendation, low to very low quality evidence).
  - + Do not let the ill child undertake any serious exertion.
  - + Make sure the ill child drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
  - + Try to bring down the fever. Consider giving the ill child a simple anti-pyretic, if the temperature is 38.5 °C or more (EB<sup>517</sup>, strong recommendation, moderate quality evidence).

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<sup>511</sup> Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence neither in favour of the use of tissues or handkerchiefs nor no use of tissues and handkerchiefs. The expert panel recommends the use of handkerchief or towel.

<sup>512</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>513</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>514</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>515</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>516</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>517</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

This is best given in the form of a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.

- + Try to stop the child scratching open the blisters by distracting him and by cutting his fingernails short. A cool, dry environment will help minimise the itching. Consult a doctor or pharmacist in the event of severe itching.
- + Keep the skin dry. Do not use eosin.
- + Open blisters can be disinfected with a watery, non-staining disinfectant.
- + Keep the ill child in bed, isolated from other people (children, family members).
- + Advise the ill child always to cover his mouth with a handkerchief or towel when coughing or sneezing (EB<sup>518</sup>, weak recommendation, very low quality evidence).
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>519</sup>, strong recommendation, low quality evidence).

## 15.7 Mumps (parotitis epidemica)

### What do you see?

- + In some cases the child has no symptoms.
- + The ill child may have fever.
- + He often has a headache, feels unwell or has a reduced appetite.
- + One or both ears are painful, especially when chewing. The throat may also be sore.
- + The cheek and neck region are swollen and extremely painful. This is due to an infection in several salivary glands (ear salivary gland, salivary glands under the tongue or in the lower jaw).

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>519</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill child
  - + Find out what is wrong with the ill child.
3. Seek help from a specialist
  - + Seek help from a specialist.
4. Administer further first aid

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<sup>518</sup> ES Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence neither in favour of the use of tissues or handkerchiefs nor no use of tissues and handkerchiefs. The expert panel recommends the use of handkerchief or towel.

<sup>519</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

- + Take the temperature (EB<sup>520, 521, 522, 523</sup>, weak recommendation, low to very low quality evidence).
- + Do not let the ill child undertake any serious exertion.
- + Make sure the ill child drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration). Avoid fruit juice as this may aggravate the pain in the salivary glands.
- + Try to bring down the fever. Consider giving the ill child a simple anti-pyretic, if the temperature is 38.5 °C or more (EB<sup>524</sup>, strong recommendation, moderate quality evidence). This is best given in the form of a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.
- + Give him high-calorie liquid food.
- + Alleviate the pain with warm compresses on the ear.
- + Keep the ill child in bed, isolated from other people (children, family members).
- + Advise the ill child always to cover his mouth with a handkerchief or towel when coughing or sneezing. (EB<sup>525</sup>, weak recommendation, very low quality evidence)
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>526</sup>, strong recommendation, low quality evidence).

## 15.8 Whooping cough (pertussis)

### What do you see?

- + For 1 to 2 weeks the child suffers from cold symptoms: runny nose, teary eyes, mild cough and moderate fever.
- + Thereafter, a serious cough develops. Following several consecutive bouts of coughing the ill child may have difficulty breathing, and turn blue. The coughing bouts can be accompanied by coughing up thick mucus.
- + Inhaling makes a whooping sound.
- + Eating often causes fits of coughing, sometimes resulting in food being vomited.
- + The severe fits of coughing can cause nosebleeds, throat bleeds or even brain damage.

### This is what you should do!

1. Make the area safe

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<sup>520</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>521</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>522</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>523</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>524</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

<sup>525</sup> ES Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence neither in favour of the use of tissues or handkerchiefs nor no use of tissues and handkerchiefs. The expert panel recommends the use of handkerchief or towel.

<sup>526</sup> ES Hygienic measures – Respiratory illness: p24 in summary book: There is limited evidence in favour of handwashing. There is evidence in favour of using gloves.

- + Wash your hands and put on disposal gloves (EB<sup>526</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill child
    - + Find out what is wrong with the ill child.
  3. Seek help from a specialist
    - + Seek help from a specialist.
  4. Administer further first aid
    - + Take the child's temperature (EB<sup>527,528,529,530</sup>, weak recommendation, low to very low quality evidence).
    - + Do not let the ill child undertake any serious exertion.
    - + Help the ill child to rest in a comfortable position if he is short of breath (for example, sitting or half-sitting, see Shortness of breath) (EB<sup>531</sup>, weak recommendation, low quality evidence).
    - + Make sure the ill child drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
    - + If the ill child has to vomit, only give small portions of food that is easy to digest.
    - + Try to bring down the fever. Consider giving the ill child a simple anti-pyretic, if the temperature is 38.5 °C or more (EB<sup>532</sup>, strong recommendation, moderate quality evidence). This is best given in the form of a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.
    - + Keep the ill child in bed, isolated from other people (children, family members).
    - + Advise the ill child always to cover his mouth with a handkerchief or towel when coughing or sneezing (EB<sup>533</sup>, weak recommendation, very low quality evidence).
    - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>534</sup>, strong recommendation, low quality evidence).

## 15.9 False croup (pseudocroup)

### What do you see?

- + Before an attack of false croup, the sick child usually just has a cold. In some cases he may have a fever, but this is not usually high.
- + Late in the evening or early in the night the child becomes anxious and starts crying.

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<sup>527</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>528</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>529</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>530</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>531</sup> ES Dyspnoea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

<sup>532</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

<sup>533</sup> ES Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence neither in favour of the use of tissues or handkerchiefs nor no use of tissues and handkerchiefs. The expert panel recommends the use of handkerchief or towel.

<sup>534</sup> ES Hygienic measures – Respiratory illness: p24 in summary book: There is limited evidence in favour of handwashing. There is evidence in favour of using gloves.

- + He has a typical barking cough and is sometimes hoarse.
- + Breathing in makes a whooping sound.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>535</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill child
  - + Find out what is wrong with the ill child.
3. Seek help from a specialist
  - + Seek help from a specialist. It is important to exclude other serious disorders (for example, croup, whooping cough, infection of the epiglottis or a foreign object in the airways).
4. Administer further first aid
  - + Take the temperature (EB<sup>536, 537, 538, 539</sup>, weak recommendation, low to very low quality evidence).
  - + Do not let the ill child undertake any serious exertion. Calm him down.
  - + Help the ill child to rest in a comfortable position if he is short of breath (for example, sitting or half-sitting, see Shortness of breath) (EB<sup>540</sup>, weak recommendation, very low quality evidence).
  - + Make sure the ill child drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
  - + Try to bring down the fever. Consider giving the ill child a simple anti-pyretic, if the temperature is 38.5 °C or more (EB<sup>541</sup>, strong recommendation, moderate quality evidence). This is best given in the form of a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.
  - + Breathing in fresh air can help to alleviate the symptoms. In many children, the attack will pass when they go outside (for example, going to the doctor).
  - + Advise the ill child always to cover his mouth with a handkerchief or towel when coughing or sneezing (EB<sup>542</sup>, weak recommendation, very low quality evidence).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>535</sup>, strong recommendation, low quality evidence).

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<sup>535</sup> ES Hygienic measures – Respiratory illness: p24 in summary book: There is limited evidence in favour of handwashing. There is evidence in favour of using gloves.

<sup>536</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>537</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>538</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>539</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>540</sup> ES Croup – Prone position: p876 in summary book: There is limited evidence in favour of prone position.

<sup>541</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

<sup>542</sup> ES Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence neither in favour of the use of tissues or handkerchiefs nor no use of tissues and handkerchiefs. The expert panel recommends the use of handkerchief or towel.

## 15.10 Child paralysis (polio)

### What do you see?

- + In many cases a polio infection goes unnoticed. Sometimes the ill child will have some flu-like symptoms. Stomach and intestinal complaints also occur, but they disappear spontaneously after a few days.
- + In some children (or adults) there can be serious complications, such as paralysis of the limbs or respiratory muscles. Meningitis can also result.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>543</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence)
2. Assess the condition of the ill child
  - + Find out what is wrong with the ill child.
3. Seek help a specialist
  - + Seek help a specialist.
4. Administer further first aid
  - + Take the temperature (EB<sup>544, 545, 546, 547</sup>, weak recommendation, low to very low quality evidence).
  - + Do not let the ill child undertake any serious exertion. Calm him down.
  - + Make sure the ill child drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).  
Try to bring down the fever. Consider giving the ill child a simple anti-pyretic, if the temperature is 38.5 °C or more (EB<sup>548</sup>, strong recommendation, moderate quality evidence). This is best given in the form of a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.
  - + Keep the ill child in bed, isolated from other people (children, family members).
  - + Advise the ill child always to cover his mouth with a handkerchief or towel when coughing or sneezing (EB<sup>549</sup>, weak recommendation, very low quality evidence).

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<sup>543</sup> ES Hygienic measures – Respiratory illness: p24 in summary book: There is limited evidence in favour of handwashing. There is evidence in favour of using gloves.

<sup>544</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>545</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>546</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>547</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>548</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

<sup>549</sup> ES Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence neither in favour of the use of tissues or handkerchiefs nor no use of tissues and handkerchiefs. The expert panel recommends the use of handkerchief or towel.

- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>550</sup>, strong recommendation).

## 15.11 RSV

### What do you see?

- + The ill child has signs of a cold.
- + He may have a fever.
- + He may suffer from an ear infection.
- + Sometimes the disease is more severe. Breathing can be hampered, with a wheezing sound. The ill child may have a heavy cough.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>550</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill child
  - + Find out what is wrong with the ill child.
3. Seek help from a specialist
  - + Seek help from a specialist.
  - + If a baby cannot get enough air, is short of breath or not drinking well and as a result shows signs of dehydration, it might be necessary to admit him to hospital.
4. Administer further first aid
  - + Take the temperature (EB<sup>551, 552, 553, 554</sup>, weak recommendation, low to very low quality evidence).
  - + Do not let the ill child undertake any serious exertion. Calm him down.
  - + Make sure the ill child drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration).
  - + Help the ill child to rest in a comfortable position if he is short of breath (for example, sitting or half-sitting, see Shortness of breath) (EB<sup>555</sup>, weak recommendation, low quality evidence).
  - + Try to bring down the fever. Consider giving the ill child a simple anti-pyretic, if the temperature is 38.5 °C or more (EB<sup>556</sup>, strong recommendation, moderate quality evidence).

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<sup>550</sup> ES Hygienic measures – Respiratory illness: p24 in summary book: There is limited evidence in favour of handwashing. There is evidence in favour of using gloves evidence in favour of using gloves.

<sup>551</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>552</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>553</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>554</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

<sup>555</sup> ES Dyspnoea – Posture: p248 in summary book: There is limited evidence in favour of the seated leaning forward position.

<sup>556</sup> ES Fever – Paracetamol: p841 in summary book: There is limited evidence in favour of paracetamol.

This is best given in the form of a suppository or syrup. Always give a dose according to body weight and read the patient information leaflet carefully. This is because anti-pyretics may have side effects.

- + Keep the ill child in bed, isolated from other people (children, family members).
- + Advise the ill child always to cover his mouth with a handkerchief or towel when coughing or sneezing (EB<sup>557</sup>, weak recommendation, very low quality evidence).
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>558</sup>, strong recommendation, low quality evidence).

## 15.12 Rotavirus

### What do you see?

- + The ill child often feels nauseous and vomits.
- + He suffers from serious, bad smelling and slimy diarrhoea for three to eight days.
- + Dehydration is a frequently occurring complication in the case of a Rotavirus infection (see Dehydration).

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>558</sup>, strong recommendation, low (handwashing) to moderate (gloves) quality evidence).
2. Assess the condition of the ill child
  - + Find out what is wrong with the ill child.
3. Seek help from a specialist
  - + Seek help from a specialist.
  - + If a baby cannot get enough air, is short of breath or not drinking well and as a result shows signs of dehydration, it might be necessary to admit him to hospital.
4. Administer further first aid
  - + Take the temperature (EB<sup>559, 560, 561, 562</sup>, weak recommendation, low to very low quality evidence).
  - + Do not let the ill child undertake any serious exertion. Calm him down.
  - + Make sure the ill child drinks enough to compensate for the loss of fluid from intense sweating (see Dehydration). He can eat if he feels hungry.

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<sup>557</sup> Spread of infection (respiratory viruses) – use of tissues: p858 in summary book: There is limited evidence neither in favour of the use of tissues or handkerchiefs nor no use of tissues and handkerchiefs. The expert panel recommends the use of handkerchief or towel.

<sup>558</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>559</sup> ES Fever – Measuring axillary temperature: p830 in summary book: There is limited evidence showing that the difference between temperature readings at the axilla and rectum using either mercury or electronic thermometers showed wide variation across studies.

<sup>560</sup> ES Fever – Measuring oral temperature: p832 in summary book: There is limited evidence showing that rectal (mercury glass) thermometry must be preferred to oral digital thermometry for daily routine measurements.

<sup>561</sup> ES Fever – Measuring temporal artery temperature: p835 in summary book: There is limited evidence showing that temporal temperatures (forehead) measured with an infrared thermometer do not reliably predict rectal temperatures (measured by digital thermometry).

<sup>562</sup> ES Fever – Measuring tympanic membrane temperature: p837 in summary book: There is limited evidence showing that the accuracy of infrared tympanic thermometry is high.

- + Help the ill child to rest in a comfortable position if he is short of breath (for example, sitting or half-sitting, see Shortness of breath).
- + Keep the ill child in bed, isolated from other people (children, family members).
- + Advise the ill child always to cover his mouth with a handkerchief or towel when coughing or sneezing.
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>563</sup>, strong recommendation, low quality evidence).

### **Summaries made for topics for which no evidence could be identified:**

- Fever – Drinking water: p839 in summary book
- Coughing – Covering mouth: p858 in summary book
- Mosquito bite – Stagnant water: p554 in summary book
- Measles – Dabbing eyes with lukewarm water: p871 in summary book
- Chickenpox – Dry environment/eosin/menthol powder: p872 in summary book
- Mumps – Warm compresses on ear: p873 in summary book
- Mumps – Fruit juices: p874 in summary book
- Pertussis – Light meal: p875 in summary book
- Croup – Fresh air: p883 in summary book
- Croup – Hot drinks: p884 in summary book
- Vomiting – Drinking (volume): p318 in summary book

### **Summaries for which studies have been identified but which have not resulted in a recommendation:**

- Croup – Humidified air: p880 in summary book

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<sup>563</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

# Pregnancy and birth

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# 1. Conception

Reproduction is the process that ensures the continuation of every form of life. A new individual arises from the merging of two different cells: a male gamete (sperm cell) and a female gamete (egg cell). We call this conception.

# 2. Pregnancy

## 2.1 The pregnancy cycle

Pregnancy is a unique occurrence. In the space of 40 weeks (calculated from the first day of the last menstruation) a fertilised egg cell develops into a baby.

The pregnancy period is divided into three trimesters:

- + The first trimester runs from week 1 up to and including week 13.
- + The second trimester runs from week 14 up to and including week 27.
- + The third trimester runs from week 28 up to the birth.

At the end of the second trimester the fetus is approximately 30 cm long, but there is hardly any subcutaneous fat tissue present. The fetus still has to put on a lot of weight.

## 2.2 Pregnancy ailments

Pregnancy requires a lot of energy. As a result of the hormonal and physical changes that the body undergoes, a pregnant woman may suffer from various minor problems: frequent urinating, nausea and vomiting, constipation, acid reflux ... These ailments are usually innocent, transitory and related to the pregnancy period. However, more serious complications can arise.

### 2.2.1 First trimester

#### 2.2.1.1 Nausea and vomiting

##### This is what you should do!

- + Try to eat small amounts at regular intervals.
- + Before getting out of bed, eat something light, for example, a rice cake, a cracker or a slice of bread.
- + Avoid acidic, spicy and greasy food.

#### 2.2.1.2 Tense breasts

##### This is what you should do!

- + Wear a good support bra.

### 2.2.1.3 Fatigue

#### This is what you should do!

- + Take sufficient rest.
- + Eat sufficient food rich in iron, for example green vegetables and nuts. Carefully rinse raw fruit and vegetables before eating.
- + When necessary, ask friends and family for help.

## 2.2.2 Second trimester

In the event of an emergency with a woman who is more than 20 weeks pregnant, it is always recommended to lay the woman on her **left side**. This prevents pressure from the uterus on the major blood vessels, which will reduce blood flow to the fetus. If the woman continues to lie on her back, the uterus (expanded by pregnancy) will close tight the vena cava inferior and the aorta. This will stagnate the return of blood to the heart (venous return) and lower the amount of blood that the heart pumps away per minute (reduction in heart minute volume or the cardiac output). This can have negative consequences for the fetus. As a result the pregnant woman may suffer from low blood pressure (hypotension due to vena cava syndrome) and may feel dizzy, nauseous and uncomfortable.

### 2.2.2.1 Constipation

#### This is what you should do!

- + Eat sufficient fibre: vegetables, fruit, wholewheat products ...
- + Drink plenty.
- + Take sufficient exercise.
- + Take your time when going to the toilet.

### 2.2.2.2 Acid reflux

#### This is what you should do!

- + Try to eat small amounts at regular intervals.
- + Eat slowly.
- + Do not consume drinks containing caffeine or fizzy drinks.
- + If necessary, sleep with your pillow raised. Ideally, position your whole bed on a slight slant, by for example putting blocks under the head end.

## 2.2.3 Third trimester

### 2.2.3.1 Frequent urinating and/or urinary leakage

#### This is what you should do!

- + Drink sufficient during the day and not too much before going to bed.
- + Do not consume drinks containing caffeine.
- + Take your time when urinating.

### 2.2.3.2 Insomnia

#### This is what you should do!

- + Use a pregnancy cushion.

- + Relax before you go to sleep.

### **2.2.3.3 Fluid retention**

#### **This is what you should do!**

- + Take sufficient exercise.
- + Drink plenty.
- + Try to rest during the day with your feet raised.

### **2.2.3.4 Pelvic pain or pelvic instability**

#### **This is what you should do!**

- + Adopt a good posture.
- + Do not bend over, always go through your knees.
- + Do not wear high heels.

## **2.3 Risks and complications**

### **2.3.1 Pregnancy diabetes**

Pregnancy diabetes is a metabolic disorder that arises or is discovered during pregnancy. During pregnancy major changes occur in the mother's metabolism. That happens mainly in order to ensure the development of the child and the placenta. The mother uses more fats as the primary source of energy and gives more sugars (glucose) to the fetus. The blood sugar levels of a pregnant woman are therefore lower than normal. Despite this, the blood sugar levels of a pregnant woman rise faster and also fall more slowly. We call this the diabetes-invoking effect of pregnancy. This may result in pregnancy diabetes. It usually disappears a few days after the birth.

### **2.3.2 Vaginal blood loss**

#### **What do you see?**

- + The pregnant woman suffers vaginal blood loss.

#### **This is what you should do!**

As a first aider there are not many treatments that you can administer to a person with suspected vaginal blood loss. The pregnant woman needs specialized help.

### **2.3.3 Miscarriage**

#### **What do you see?**

- + The pregnant woman suffers vaginal blood loss.
- + She is experiencing pain in the lower abdomen or lower back (similar to menstrual pain).
- + The amniotic sac is expelled. This may only happen a few days after the initial bleeding. Because of the presence of blood clots, it is not always easy to define this moment.

#### **This is what you should do!**

1. Make the area safe

- + Wash your hands and put on disposal gloves (EB<sup>564,565</sup>, strong recommendation, (very) low to moderate quality evidence).
  - + Take the woman to a quiet, comfortable location with the necessary privacy.
2. Assess the condition of the pregnant woman
    - + Find out what is wrong with the pregnant woman.
  3. Seek help from a specialist
    - + Any woman who has suffered a miscarriage must be further examined.
      - o Is the bleeding severe? Call the emergency services immediately on 112.
      - o Is the bleeding light? Seek help from a specialist.
  4. Administer further first aid
    - + Give the pregnant woman a sanitary towel or a clean towel.
    - + Put the woman in a lying position, on her left side.
    - + Use the necessary tact to preserve the remains that have been expelled via the vagina, so that they can be inspected by a specialist.
    - + The woman is experiencing an emotional trauma. Treat her with compassion.
    - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>564,565</sup>, strong recommendation, (very) low to moderate quality evidence).

## 2.3.4 Detached placenta

### What do you see?

- + The pregnant woman may suffer vaginal blood loss.
- + She experiences sudden, severe stomachache and backache.
- + Her belly is hard.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>564,565</sup>, strong recommendation, (very) low to moderate quality evidence).
2. Assess the state of the pregnant woman
  - + Find out what is wrong with the pregnant woman.
3. Seek help from a specialist
  - + Ask someone to call the emergency services on 112. Do this yourself if you are alone.
4. Administer further first aid
  - + Give the pregnant woman a sanitary towel or a clean towel.
  - + Put the woman in a lying position, on her left side.
  - + Use the necessary tact to preserve the remains that have been expelled via the vagina, so that they can be inspected by a specialist.
  - + The woman is experiencing an emotional trauma. Treat her with compassion.

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<sup>564</sup> ES Wound management – Wearing gloves for bleeding effects for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that first aiders wash their hands and wear gloves in the event of possible contact with blood.

<sup>565</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>566,567</sup>, strong recommendation, (very) low to moderate quality evidence).

## 2.3.5 Vaginal fluid loss

### What do you see?

- + The pregnant woman suffers vaginal fluid loss.

### This is what you should do!

1. Make the area safe
  - + Wash your hands and put on disposal gloves (EB<sup>566,567</sup>, strong recommendation, (very) low to moderate quality evidence).
2. Assess the state of the pregnant woman
  - + Find out what is wrong with the pregnant woman.
3. Seek help from a specialist
  - + Always seek help from a specialist to ensure that it is not amniotic fluid.
4. Administer further first aid
  - + Give the pregnant woman a sanitary towel or a clean towel.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>566,567</sup>, strong recommendation, (very) low to moderate quality evidence).

## 2.3.6 Blow or bump to the belly

### What do you see?

- + A pregnant woman has received a blow or bump to the belly.

### This is what you should do!

1. Make the area safe
  - + Check that the situation is under control. Take care of the pregnant woman only if there is no risk of you or she receiving another blow or bump.
2. Assess the condition of the injured woman
  - + Find out what is wrong with the injured woman.
3. Seek help from a specialist
  - + Seek help from a specialist so that he can ascertain whether there are any consequences for the baby.
4. Administer further first aid
  - + Put the injured woman in a lying position, on her left side.

## 2.3.7 Pre-eclampsia

### What do you see?

The pregnant woman suffers from:

- + headache;

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<sup>566</sup> ES Wound management – Wearing gloves for bleeding effects for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that first aiders wash their hands and wear gloves in the event of possible contact with blood.

<sup>567</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

- + tingling fingers;
- + generalised fluid retention (oedema), especially in the face;
- + pain in the upper abdomen (girdle sensation);
- + nausea and vomiting;
- + impaired vision such as stars or black spots in front of the eyes.

### **This is what you should do!**

As a first aider there are not many treatments that you can administer to a person with suspected pre-eclampsia. The pregnant woman needs specialized help. Let the pregnant woman rest. Put her in a lying position, on her left side.

### **Preventing complications in pregnancy**

Some actions and habits entail risks for the development of a baby.

- + Do not take alcohol or drugs during pregnancy. The risks include delayed growth, a low birth weight, a small skull with possible facial disorders (eyes that appear to be too far apart, overhanging eyelids, flat nose, narrow top lip), neurological abnormalities, poor suckling reflex, irritable, frequent crying ... At a later age this may translate into poor social functioning, hyperactivity, mental handicap and autistic behaviour. Alcohol and drugs can also increase the risk of cot death.
- + Avoid caffeinated beverages.
- + Do not smoke during pregnancy. Smoking (including passive smoking) during pregnancy incurs various risks. The harmful substances in cigarettes cause reduced blood flow from the placenta and therefore reduced oxygen for the child. The risks for the child are a low birth weight, retarded growth or premature birth. Furthermore, the child will have an increased risk of cot death, respiratory infections and asthma. There are also risks for the mother associated with smoking during pregnancy: it may cause haemorrhaging, the placenta may detach and the waters may break prematurely.
- + Always consult a doctor before using medication during pregnancy.

### **Preventing preeclampsia**

Attend the prenatal consultations regularly so that your blood pressure and urine can be checked.

### **Preventing toxoplasmosis**

Toxoplasmosis (cat disease) is an infectious disease caused by the parasite *Toxoplasma gondii*. Infections occur as a result of contact with cat faeces, eating infected raw meat and raw vegetables or contact with infected soil or water. The disease is usually innocent and characterised by vague symptoms such as fatigue, mild fever, swollen glands and skin rash. Toxoplasmosis can go by unnoticed. If a woman has had the disease before, she will be immune to getting it a second time. If a woman is infected for the first time when she is pregnant, there can be serious consequences. The parasite can be transferred via the placenta to the fetus. The possible consequences are a miscarriage, developmental disorders or abnormalities in the brain and eyes. An infection is most dangerous during the first three months of the pregnancy. A blood test at the beginning of the pregnancy will establish whether or not the pregnant woman has already had the disease. During the period of pregnancy this is checked several times with a blood test. There is no vaccine against toxoplasmosis.

If you are not immune to toxoplasmosis when you are pregnant, take the following precautions to prevent infection:

- + Have someone else clean out the cat litter. Faeces from other animals are not a risk. Wash your hands after contact with cats.
- + Ensure that meat or vegetables are properly cooked, baked or steamed. Do not eat raw or rare meat. Be careful when eating meat at a barbecue, for example.
- + Wash fruit and vegetables thoroughly, or peel them.
- + When eating in a restaurant, select cooked vegetables.
- + Wash your hands before every meal and after touching vegetables, fruit and raw meat.
- + Wash kitchen utensils after contact with vegetables, fruit and raw meat.
- + Always wear gardening gloves when working in the garden. Wash your hands afterwards.

### Preventing listeriosis

Listeriosis is an infectious bacterial disease caused by *Listeria monocytogenes*. Food is usually the prime cause of infection. The pregnant woman exhibits with flu-like symptoms such as fever, lethargy, nausea and headache. An infection during pregnancy can have serious consequences for the fetus, for example blood poisoning or a miscarriage.

The following precautionary measures are important for pregnant women:

- + Wash raw fruit and vegetables thoroughly before eating them.
- + Do not eat raw meat.
- + Do not eat products made with raw milk.
- + Do not eat smoked fish.
- + Do not eat raw eggs.
- + Do not use the same kitchen utensils for the preparation of both meat and vegetables.
- + Heat food properly (cooking, baking, steaming).
- + Wash your hands after touching raw vegetables, fruit and meat.

### Preventing cytomegalia

Cytomegalia is an infectious disease caused by the cytomegalovirus (CMV). If a pregnant woman develops this infection, there can be serious consequences for the fetus. There can be long-term problems such as learning difficulties, deafness, blindness or retarded growth.

The virus can be present in tears, nasal discharge, saliva, urine and stools. Pregnant women should take the following precautions:

- + Wash your hands regularly:
  - o after contact with children's urine (changing nappies, touching the potty);
  - o when you help your child blow his nose;
  - o when you have given food to a child;
  - o after touching children's toys.
- + Avoid contact with saliva:
  - o do not kiss on the mouth;
  - o do not put pacifiers in your mouth.
- + Clean children's toys, kitchen equipment and work surfaces regularly.

Women who are in contact with young children as part of their job (for example, child carers in a nursery) should stop this activity as soon as possible after their pregnancy is confirmed.

### Preventing infectious diseases

Vaccination is the best way to avoid infectious diseases. Pregnant women are advised to get themselves vaccinated against flu, whooping cough and German measles (see Infectious diseases).

## 3. Giving birth

### 3.1 Birth procedure

After approximately 40 weeks of pregnancy (calculated from the first day of the last menstruation), the big day has arrived: the baby is ready to come out into the world. The birth proceeds in various phases, namely the dilation, the expulsion and the afterbirth.

There is usually a long period between the first signs and the actual birth. This is referred to as labour. Labour often lasts longest with the birth of the first child. For subsequent births, labour is usually shorter.

#### 3.1.1 Signs of an imminent birth

There are various different signs that a baby is ready to be born:

- + The pregnant woman experiences contractions. These are contractions of the uterus which cause a pressing and painful sensation in the lower abdomen and back of the pregnant woman. Initially the **contractions** feel like menstrual pain. They become more and more frequent and regular and more painful. After a while it becomes difficult to relax between them. The pressure in the back and/or pelvis increases.
- + The **mucus plug** is located in the cervix and seals off the uterus. It protects the baby against infections. As the cervix changes, blood may get mixed up with the mucus. We call the loss of the mucus plug with a little blood the 'show'. It is an indication that the cervix is slowly opening. The amount of blood loss is similar to that with beginning menstruation.
- + The membranes can rupture unexpectedly (amniotic fluid leakage). Amniotic fluid can come out in drops, in little or in large amounts. This process is not painful. Amniotic fluid is clear with white flakes. Because it is not always obvious if the leakage is urine or amniotic fluid, it is useful to know that amniotic fluid (unlike urine) cannot be held in. The membranes may also break at a later stage. They often break during the actual dilation phase.

#### 3.1.2 Dilation of the cervix

The regular contractions shorten the cervix until it is fully dilated. The cervix then opens gradually until it is completely dilated. Full dilation occurs when there is a 10 cm opening of the cervix. The baby then has enough room to be born. In the case of a first pregnancy, this phase lasts on average from 8 to 12 hours. The pregnant woman may walk around and move in this period. If she wants to lie down, she should do so on her left side.

In the case of a first pregnancy parents often present too early at the hospital. This is normal. However, you only need to go to the hospital when the contractions start, the mucus plug or blood is lost or the waters break. A pregnant woman should go to the hospital as soon as possible if:

- + the contractions become more painful, more regular and there is less time between them (approximately 5 minutes between each contraction);
- + the waters break;
- + there is blood loss;
- + the pregnant woman feels the baby moving less than normal;
- + she is in doubt.

### 3.1.3 The expulsion phase or birth

The contractions come in quick succession and are more intense. The pregnant woman experiences an unstoppable urge to push.

Each time the woman pushes, the baby falls further down into the birth canal until it is finally born. This phase lasts on average 45 minutes for a first pregnancy (but can also happen much quicker).

### 3.1.4 The afterbirth

Just after the birth, the baby is still attached to the placenta via the umbilical cord. The umbilical cord is clamped in two places and then cut between these two points. As the placenta begins contracting again, the placenta is expelled. This usually happens within an hour of the birth. It is important that there are no remains of the placenta left in the uterus, as this can cause infections or haemorrhaging. This is why the placenta is always inspected thoroughly.

## 3.2 First aid at a birth

### What do you see?

- + The woman gets contractions in quick succession, and then an irresistible urge to push.
- + The waters may break, causing loss of amniotic fluid.
- + The baby (and placenta) is born.

### This is what you should do!

1. Make the area safe
  - + Put on disposable gloves (EB<sup>568,569</sup>, strong recommendation, very low to moderate quality evidence).
2. Assess the condition of the pregnant woman
  - + Check her consciousness.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services immediately on 112. Even if the baby has already been delivered, mother and baby need specialized help.
4. Administer further first aid
  - + Remove any clothing that may hinder the birth and cover the pregnant woman's lower half with a sheet.
  - + Help the woman to find a comfortable position. If the woman is going to push, you can ask her to lie on her back.
  - + If you have no experience in assessing the dilation, there is no point in examining the pregnant woman's vagina. All you need to do is part the labia to see if the baby's head is descending.
  - + Get ready to catch the baby. Newly born babies are slippery, so be very careful.
  - + You should never pull the baby from the birth canal.
  - + Dry the baby and cover his head. Keep the mother warm as well. Use warm, clean blankets.

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<sup>568</sup> ES Wound management – Wearing gloves for bleeding effects for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that first aiders wash their hands and wear gloves in the event of possible contact with blood.

<sup>569</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

- + Place the baby as quickly as possible on the mother's bare chest or stomach. This is called skin-to-skin contact. It has a positive effect not only on the wellbeing of the baby and the success of breastfeeding, but also on the mother (EB<sup>570</sup>, weak recommendation, low quality evidence).
- + Leave the cutting of the umbilical cord to the specialists. The umbilical cord does not need to be cut immediately after the birth. If you do have to cut it (for example, in order to resuscitate the baby or because the mother is experiencing impaired consciousness), do not do so until at least 1 minute after the delivery. This way there is less chance that the baby will become anaemic or suffer from a shortage of iron. Tie the umbilical cord with ribbon (for example, clean shoelaces or strips of cloth) at two places: at 2 cm and 5 cm from the baby's tummy. Cut the cord between the two ribbons. If the cord continues to bleed on the baby's end, tie it again there (EB<sup>571</sup>, strong recommendation, moderate quality evidence).
- + Never pull on the umbilical cord. The afterbirth of placenta and amniotic fluid usually comes out by itself. Keep the afterbirth so that it can be checked by medical specialists.
- + Check the baby. He must be able to breathe easily, he should be light pink in colour and have pink lips. A pale complexion and the presence of spots on the skin may indicate a possible infection. Weak breathing, poor muscle tension, blue hands and feet and poor response is a bad sign. The baby needs urgent medical attention.
- + Check to see if the mother is bleeding. Mild bleeding from the birth canal is normal.
- + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>572,573</sup>, strong recommendation, (very) low to moderate quality evidence).

## 3.3 Complications

### 3.3.1 The baby is not breathing

#### What do you see?

- + The baby is not breathing or crying immediately after birth.
- + The baby is limp and not moving. He has no muscle tension (muscle tone).

#### This is what you should do!

1. Make the area safe
  - + Put on disposable gloves (EB<sup>574</sup>, strong recommendation, very low to moderate quality evidence).
2. Assess the condition of the baby
  - + Check his consciousness.
  - + Open the airway and check the breathing.

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<sup>570</sup> ES Pregnancy and delivery – Early skin-to-skin contact by mothers: p900 in summary book: There is limited evidence in favour of skin-to-skin contact for breastfeeding outcomes, infant outcomes and maternal outcomes.

<sup>571</sup> ES Pregnancy and delivery – Timing of umbilical cord clamping: p905 in summary book: There is limited evidence in favour of late cord clamping (after 60 seconds of the birth of the infant).

<sup>572</sup> ES Wound management – Wearing gloves for bleeding effects for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that first aiders wash their hands and wear gloves in the event of possible contact with blood.

<sup>573</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>574</sup> ES Wound management – Wearing gloves for bleeding effects for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that first aiders wash their hands and wear gloves in the event of possible contact with blood.

3. Seek help from a specialist
  - + You should always call the emergency services for any birth. Call them again on 112 to tell them that the baby is not breathing.
4. Administer further first aid
  - + Dry the baby and keep him warm in a blanket. Cover the head in particular.
  - + Remove fluid or mucus from the nose and mouth with the tip of a clean towel or cloth.
  - + Try to stimulate breathing by massaging the back and tickling the soles of the feet.
  - + Start resuscitation (see Resuscitation).
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>575,576</sup>, strong recommendation, low quality evidence).

### 3.3.2 Severe bleeding in the mother

#### What do you see?

- + The mother is bleeding severely after the birth.
- + In many cases she will feel unwell. She may look pale.

#### This is what you should do!

1. Make the area safe
  - + Put on disposable gloves (EB<sup>575</sup>, strong recommendation, very low to moderate quality evidence).
2. Assess the condition of the mother
  - + Check her consciousness.
  - + Open the airway and check the breathing if necessary.
3. Seek help from a specialist
  - + Call the emergency services immediately on 112.
4. Administer further first aid
  - + The following actions may slow the bleeding:
    - o massage the stomach firmly beneath the belly button (EB<sup>577</sup>, weak recommendation, low quality evidence);
    - o ask the woman to urinate.
  - + Keep the woman warm. Use warm, clean blankets.
  - + Take off your disposable gloves and wash your hands after administering first aid (EB<sup>575,576</sup>, strong recommendation, low quality evidence).

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<sup>575</sup> ES Wound management – Wearing gloves for bleeding effects for patients: p34 in summary book: There is limited evidence neither in favour of wearing sterile gloves nor not wearing gloves. Expert opinion: Experts recommend that first aiders wash their hands and wear gloves in the event of possible contact with blood.

<sup>576</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>577</sup> ES Uterine massage for postpartum haemorrhage: p946 in summary book: There is limited evidence either in favour of uterine massage with 10U oxytocin or 10U oxytocin. Expert opinion: Experts recommend massaging the stomach.

## 4. Postnatal period

### 4.1 Postnatal period

The baby has arrived. The birth has been registered with the city. Now there is a six-week postnatal period.

### 4.2 Risks

#### 4.2.1 Cot death

##### What do you see?

- + The baby does not respond and is lying limp in his bed.
- + The baby's skin is blue and sometimes feels cold.

##### This is what you should do!

1. Make the area safe
2. Assess the condition of the baby
  - + Check his consciousness.
  - + Open the airway and check the breathing.
3. Seek help from a specialist
  - + Call the emergency services immediately on 112.
4. Administer further first aid
  - + Do not shake the baby!
  - + Start resuscitation (see Resuscitation).
  - + Wash your hands after administering first aid (EB<sup>578</sup>, weak recommendation).

##### Preventing cot death

- + Place the baby on its back to sleep (EB<sup>579</sup>, weak recommendation, low quality evidence).
- + Provide a safe place to sleep:
  - o Lie the baby in a safe bed. That means a cot, with a perfect fitting hard and breathable mattress on a slatted or gridded frame.
  - o Do not use a duvet (for children younger than one year); it is better to use a sleeping bag that is the right size for the baby. A sheet with a blanket is also possible, but in this case you should place your baby with its feet as close to the end of the bed as possible.
  - o Do not use electric blankets or cherry pit cushions.
  - o Do not put unnecessary objects in the cot, such as cuddly toys or cushions.
  - o Let the baby sleep in the parent's room until the age of 6 months (EB<sup>580</sup>, weak recommendation, low quality evidence).

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<sup>578</sup> ES Hygienic measures – Respiratory Illness: p24 in summary book: There is limited evidence in favour of hand washing. There is evidence in favour of using gloves.

<sup>579</sup> ES Sudden infant death syndrome (SIDS) – Position: p951 in summary book: There is limited evidence in favour of sleeping in the supine position.

<sup>580</sup> ES Sudden infant death syndrome (SIDS) – Sleeping in parent's room: p965 in summary book: There is limited evidence with benefit for an infant sleeping in the parent's bedroom regarding the prevalence of sudden infant death syndrome.

- Do not let the baby sleep in the parent's bed (EB<sup>581</sup>, weak recommendation, very low quality evidence).
- + Make sure the baby does not get too warm:
  - The room is best kept at a temperature no higher than 18 °C (EB<sup>582</sup>, weak recommendation, very low quality evidence).
  - Use clothing and bed linen appropriate for the room temperature.
  - Air the bedroom.
- + Do not smoke in the house. Smoking can increase the risk of cot death (EB<sup>583</sup>, strong recommendation, moderate quality evidence).
- + Do not give the baby medication without medical advice. Some medicines can cause the baby to fall into a longer deep sleep and increase the risk of cot death. Do not use medication yourself either without medical advice. This can be passed to the baby through the breastmilk.
- + Give breastmilk. Babies that are breastfed are at less risk of cot death (EB<sup>584</sup>, weak recommendation, low quality evidence).
- + Give the baby a pacifier while sleeping. Sleeping with a pacifier reduces the risk of cot death. Never use a pacifier chain in bed (EB<sup>585</sup>, weak recommendation, low quality evidence).
- + Do not blindly trust items that claim to prevent cot death (for example, alarm systems that record the baby's breathing, special pillows ...) (EB<sup>586</sup>, weak recommendation, very low quality evidence)
- + Create a peaceful and regular routine. Check on your sleeping baby at regular intervals, especially after it has been crying. Be extra vigilant if its normal routine is disrupted.
- + Make sure that you can always react correctly if necessary: consume alcohol in moderation and do not take drugs. Drinking alcohol and using drugs can increase the risk of cot death (EB<sup>587</sup>, weak recommendation, very low quality evidence).
- + Have your baby vaccinated (see Childhood diseases). Vaccinated babies have a lower risk of cot death (EB<sup>588</sup>, weak recommendation, very low quality evidence).
- + Do not swaddle your baby while it is sleeping (swaddling is wrapping a blanket around a baby to help it sleep peacefully). Swaddled babies are at increased risk of cot death.

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<sup>581</sup> ES Sudden infant death syndrome (SIDS) – Bed sharing: p958 in summary book: There is limited evidence with harm for bed sharing.

<sup>582</sup> ES Sudden infant death syndrome (SIDS) – Room temperature: p960 in summary book: There is limited evidence with harm for a higher room temperature (i.e. excess thermal insulation).

<sup>583</sup> ES Sudden infant death syndrome (SIDS) – Smoking: p972 in summary book: There is evidence with harm for postnatal maternal smoking.

<sup>584</sup> ES Sudden infant death syndrome (SIDS) – Breast feeding: p953 in summary book: There is limited evidence in favour of breast feeding.

<sup>585</sup> ES Sudden infant death syndrome (SIDS) – Pacifier: p962 in summary book: There is limited evidence with benefit for pacifier use.

<sup>586</sup> ES Sudden infant death syndrome (SIDS) – Home monitoring device: p956 in summary book: There is limited evidence neither in favour of monitoring devices nor not using monitoring devices.

<sup>587</sup> ES Sudden infant death syndrome (SIDS) – Alcohol or drugs: p974 in summary book: There is limited evidence with harm for postnatal maternal alcohol consumption. There is limited evidence with harm for postnatal maternal drug use.

<sup>588</sup> ES Sudden infant death syndrome (SIDS) – Vaccination: p982 in summary book: There is limited evidence with benefit of vaccination.

**Summaries made for topics for which no evidence could be identified:**

- ES Miscarriage – Clinical signs: p886 in summary book
- ES Wound management - Wearing gloves for bleeding effects for care givers: p32 in summary book
- ES Wound management – Wearing plastic bags for bleeding for care givers: p38 in summary book
- ES Wound management – Wearing plastic bags for bleeding for patients: p40 in summary book
- ES Pre-eclampsia – Clinical signs: p887 in summary book
- ES Toxoplasmosis – Baking/steaming/cooking vegetables/meat/fish: p889 in summary book
- ES Listeriosis – Baking/steaming/cooking vegetables/meat/fish: p890 in summary book
- ES Pregnancy and delivery – Cutting/clamping umbilical cord (technique): p904 in summary book
- ES Urinating for postpartum haemorrhage: p950 in summary book
- ES Sudden infant death syndrome (SIDS) – Sleep monitoring: p981 in summary book

**Summaries for which studies have been identified but which have not resulted in a recommendation:**

- ES Pregnancy and delivery – Body position: p891 in summary book
- ES Pregnancy and delivery – Massage: p923 in summary book
- ES Pregnancy and delivery – Restriction of fluids and food: p929 in summary book
- ES Pregnancy and delivery – Relaxation techniques: p933 in summary book
- ES Pregnancy and delivery – Warm compresses: p938 in summary book
- ES Pregnancy and delivery – Antiseptics: p910 in summary book
- ES Pregnancy and delivery – Breastfeeding: p919 in summary book
- ES Pregnancy and delivery – Breastfeeding (child outcomes): see appendix 7