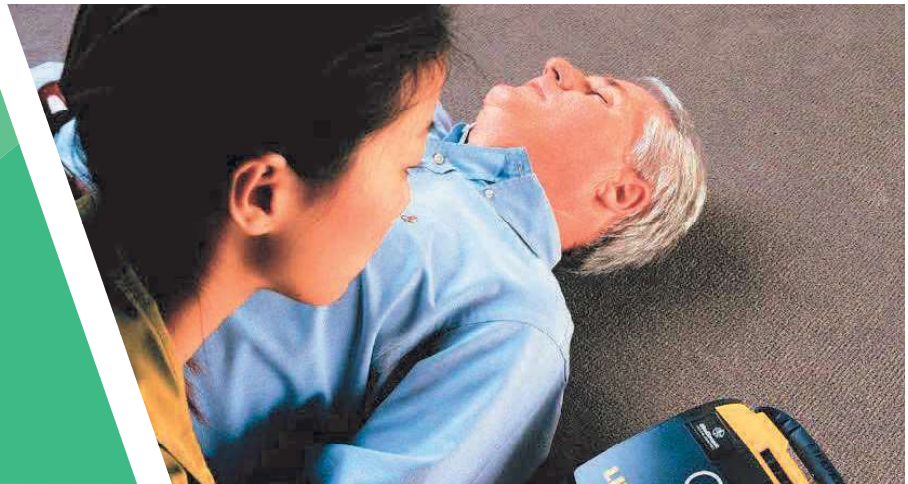
St. John Ambulance

SAVING LIVES
at work, home and play

FIRST AID
REFERENCE GUIDE



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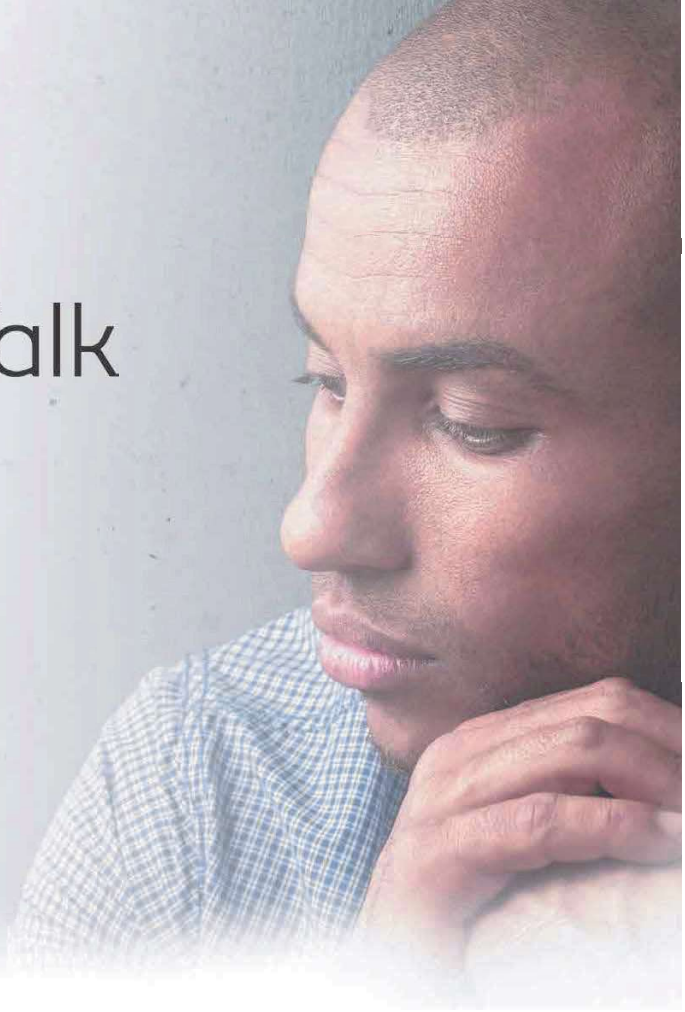

Bell Let's Talk

St. John Ambulance Canada would like to thank Bell Let's Talk for its funding and support of our mental health awareness project.

By including mental health and wellness material in this guide, we are opening the conversation about mental health in first aid classes across Canada.

St. John Ambulance
SAVING LIVES
at work, home and play

FIRST AID

St. John Ambulance Saint-Jean

SAVING LIVES at work, home and play

SAUVER DES VIES au travail, à la maison et dans les loisirs

REFERENCE GUIDE

Fourth Edition

St John
St-Jean

Fourth edition – January 2019

Certification

Knowledge of the information contained in this book does not constitute an endorsement of a user's qualifications by St. John Ambulance. A user's qualifications are recognized by St. John Ambulance only after the successful completion of a St. John Ambulance training course, which includes practical activities and formal assessment of knowledge and skills, and the issuance of a training certificate.

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Medical advisory group for St. John Ambulance

St. John Ambulance is a leading provider of first aid training in Canada offering its courses to over half a million Canadians each year. St. John Ambulance is committed to providing Canadians with first aid training that is based on scientific evidence and that reflects emerging trends in first aid and emergency care. A Medical Advisory Group has been established to support the adoption of evidence based practice and to contribute to shaping the future of first aid by providing technical expert advice to St. John Ambulance.

The purpose of the Medical Advisory Group is to a) provide advice and recommendations to SJA on the appropriateness of first aid practices in accordance with the scientific evidence and b) advise on emerging trends in first aid and emergency care that may impact SJA programs.

Below are the names and credentials of the members of our Medical Advisory Group. We are proud to have them as part of our community.

- Dr. Robert Boyko, MD, CCFP(EM), FCFP
- Dr. Trevor Jain, BSc, MD, CCFP(EM), MSc
- Dr. Brian Metcalfe, BSc, MD, CCFP(EM)
- Dr. Jonathan Wallace, PCP, BSc, MD, CCFP(EM,FPA) FRACGP
- Steven Anas, PCP
- Kevin Morgan, BAHSc, A-EMCA

St. John Ambulance

St. John Ambulance is a charity and international humanitarian organization dedicated to helping Canadians improve their health, safety and quality of life through training and community service. Revenue generated from first aid/CPR training supports St. John Ambulance's charitable work in Canada and around the world.

Coast-to-coast, more than 12,000 front-line volunteers serve communities by providing first aid services at public events and during emergencies. St. John Ambulance volunteers also improve quality of life through programs that help seniors, the disadvantaged, and youth.

As Canada's leading authority in first aid and CPR services since 1883, St. John Ambulance offers innovative programs and products to save lives at work, home, and play.

To contact your local St. John Ambulance, visit www.sja.ca.

Fast facts

- Established in 1883 in Canada with roots going back 900 years
- Issues over 500,000 certificates in first aid and CPR to Canadians each year
- Supports humanitarian relief efforts across Canada and around the world
- St. John Ambulance front-line volunteers provide service at approximately 10,000 public events annually
- More than 1 million volunteer hours of community service are provided annually
- More than 100,000 individuals were assisted by St. John Ambulance volunteers in 2014
- 365 Canadians were formally recognized for their efforts to save a life in 2015
- Approximately 3,000 St. John Therapy Dog teams provided over 200,000 volunteer hours in 2014

This Reference Guide was developed in accordance with the 2016 Canadian Consensus Guidelines on First Aid and CPR, an evidence-based set of recommendations on training and standards of practice for first aid and CPR. The guidelines are released by the Canadian Guidelines Consensus Task Force comprised of the Heart and Stroke Foundation, the Canadian Red Cross, St. John Ambulance, the Canadian Ski Patrol, and the Lifesaving Society.

Disclaimer

The information ("Information") provided in this book is for general use and knowledge and does not contain all information that may be relevant to every situation. The Information cannot be relied upon as a substitute for seeking guidance from appropriate professionals, such as physicians. Users acknowledge and agree that St. John Ambulance is not responsible or liable for the user's actions or decisions resulting from the information (including information regarding medication or other drugs) in this book, including but not limited to choosing to seek or not to seek advice from medical professionals such as physicians.

St. John Ambulance cautions users of this book not to prescribe or administer any medication, including over-the-counter medication, except in instances where permitted by law. Inclusion of symptom relief medication in workplace first aid kits falls outside the scope of this book. Access and dispensing of symptom relief medication in the workplace must be done in accordance with the employer directives and any applicable law.

Although St. John Ambulance takes great care to reflect the most current and accurate information at time of publication, it does not represent or warrant that the information contained in this book will be accurate or appropriate at time of reading or use due to evolving medical research, protocols, regulations and laws. It is the responsibility of the user of this book to be knowledgeable of changes in acceptable practices when providing first aid, and applicable laws and regulations in which first aid may be provided.

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Emergency Phone Numbers

Police	_____
Fire	_____
Ambulance	_____
Poison Control	_____
Emergency Contact	
Name	_____
Phone	_____
Home Phone	_____
Street Address	_____

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Chapter 1

Introduction to First Aid

- Roles and responsibilities
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1 Chapter 1 Introduction to First Aid

This guide covers a wide range of information that will help you respond appropriately in a first aid or medical emergency. The introductory chapter contains background information, definitions and other material related to giving first aid. Chapter 2 explains casualty management including issues that relate to assessment of the casualty. This chapter also includes topics that are important to understand in the first critical moments at the emergency scene. Chapter 5 deals with issues of particular interest to health care providers—responders with a specific duty to respond within the health care system.

This guide is used to support the teaching of these and other courses:

- Standard and Emergency First Aid
- Basic and Intermediate First Aid
- CPR at all levels including Basic Life Support/Health Care Provider (BLS/HCP)

Some content contained in this guide will not pertain specifically to the level of training you have received. First aiders should always remember not to exceed their training, or the regulations/legislation of their province or territory.

Roles and responsibilities

What is first aid?

First aid is emergency help given to an injured or suddenly ill person using readily available materials. A person who takes charge of an emergency scene and gives first aid is called a first aider. The injured or ill person is called a casualty.

The three priorities of first aid, in order of importance, are to:

- Preserve life
- Prevent the illness or injury from becoming worse
- Promote recovery

Introduction to First Aid

1

What can a first aider do?

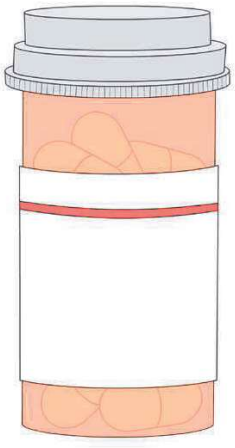
First aiders do not *diagnose or treat injuries or illnesses* (except, perhaps, when they are very minor)—this is what medical doctors do. A first aider *suspects injuries and illnesses*, and *gives first aid* at the scene.

Besides giving first aid, it is important to:

- Protect the casualty's belongings
- Keep unnecessary people away
- Reassure family or friends of the casualty
- Clean up the emergency scene and work to correct any unsafe conditions that may have caused the injuries in the first place

First aiders within a workplace may have obligations and protections under federal, provincial, and territorial legislation regarding administering medications. Refer to federal, provincial, or territorial legislation and regulations for the requirements in your area.

When assisting with medications, the first aider should check the label and ensure the following "5-rights" are met:



- Right **Person** – the name of the casualty is the name on the medication
- Right **Medication** – is this the right medication for this situation?
- Right **Amount** – what are the dosing instructions
- Right **Method** – how is this medication to be taken? (By mouth, inhaled, etc.)
- Right **Time** – is this the right time to take this medication?

1

A casualty's age in first aid and CPR

The procedures related to the provision of first aid and cardiopulmonary resuscitation (CPR) differ in some ways, depending on the age and size of the casualty.

In first aid and CPR:

- An **infant** casualty is under one year old
- A **child** casualty is from age one to age eight
- An **adult** casualty is over eight years of age

It is important to recognize that these ages are guidelines. The size of the casualty must be considered.

First Aid in the Workplace

Workplace first aid is emergency care given by a person who is trained (and designated) to be the first aid provider to a co-worker who is injured or suddenly ill. All provinces and territories have a provision within legislation relating to first aid in the workplace. Refer to your provincial or territorial regulations for what is required in your area.

Giving first aid as part of your job

When giving first aid is part of your job, you have a duty to use reasonable skill and care based on your level of training. There are regulations to protect the first aider. For example in workplaces regulated by the Canada Labour Code, Section 126(3) of the Code states:

"No employee is personally liable for anything done or omitted to be done in good faith by the employee when the employee is assisting the employer, as requested by the employer, in providing first-aid or in carrying out any other emergency measures."

Every workplace in Canada is required under federal, provincial, or territorial regulations to have a first aid kit. The size and contents of the first aid kit will be determined by those regulations. First aid providers are encouraged to be familiar with the contents of their workplace first aid kit, its location, and to conduct regular inspections of the kit.

First Aid as part of OHS

Provincial and territorial regulations and legislation contain requirements for first aid training in their jurisdiction. Most regulations require at least one designated first aid provider at work at all times. The level of training required by the first aid provider will depend on the size of the workplace, the distance to medical help, and the risk of injury in the workplace.

To help ensure compliance with regulations, it is recommended to have more than one person on each shift trained in first aid to account for holidays, illness, and breaks.

OHS Legislation

Provinces and territories are responsible for establishing Occupational Health and Safety legislation to protect workers. All workplaces that fall under provincial or territorial jurisdiction concerning regulations are required to adhere to the legislation and regulations of that province or territory. Those work places that fall under federal jurisdiction are subject to the Canada Labour Code.

Housed within the legislation and regulations are provisions for adequate first aid coverage for a workplace, usually based on some or all of the following:

- The number of workers
- The potential risks
- The distance from medical care

First aid and the law

Note that St. John Ambulance is not giving legal advice. This guide is not intended to replace advice given by a lawyer or legal professional.

Principles of the Good Samaritan

Across Canada Good Samaritan laws and principles protect first aiders from lawsuits. You are a Good Samaritan if you are a bystander who helps a person when you have no legal duty to do so. As a Good Samaritan, you give your help without being paid, and you give it in good faith. Whenever you help a person in an emergency situation, you should abide by the following principles:

1

- You identify yourself as a first aider and get permission to help the injured or ill person before you touch them—this is called **consent**
- You use **reasonable skill and care** in accordance with the level of knowledge and skill that you have
- You are not **negligent** in what you do
- You do not **abandon** the person

Consent

The law says everyone has the right not to be touched by others. As a first aider, you must respect this right.

Always ask if you can help. If the casualty cannot answer, you have what is called **implied consent,** and you can help.

If the casualty is an infant or a young child, you must get consent from the child's parent or guardian. If there is no parent or guardian at the scene, the law assumes the casualty would give consent if they could, so you have implied consent to help.

A person has the right to refuse your offer of help. In this case, do not force first aid on a conscious casualty. If you do not have consent to help, there may be other actions you can take without touching the casualty, such as controlling the scene, and calling for medical help.

Be aware of difficulties in communicating when a casualty:

- Is hard of hearing
- Speaks a different language
- Is visually impaired
- Is a child
- Is in pain
- Shows signs of mood disorder

Reasonable skill and care

As a Good Samaritan, when you give first aid you are expected to use reasonable skill and care according to your level of knowledge and skills.

Negligence

Give only the care that you have been trained to provide, and always act in the best interest of the casualty.

Abandonment

Never abandon a casualty in your care. Stay until:

- You hand them over to medical help
- You hand them over to another first aider
- They no longer want your help—this is usually because the problem is no longer an emergency, and further care is not needed

Check your applicable workplace legislation/ regulations

Giving first aid in Quebec

The Quebec Charter of Human Rights and Freedoms declares that any person whose life is in danger has the right to be helped. This means that you are required to help a person whose life is at risk, provided you do not put your own life, or anyone else's, in danger.

Safety and personal protection

In any emergency, first aid providers must always be aware of hazards and give first aid safely. A hazard is anything that poses a risk of injury or death to a first aid provider. There are three basic types of risks to be aware of:

- The energy source that caused the original injury—is the mechanism that caused the original injury still active, causing injury to others? Example: where an injury has been caused by machinery, is the machinery still running?
- There may be hazards caused by external factors. Example: passing vehicles may pose a risk at the scene of a motor vehicle incident
- There may be hazards associated with first aid procedures or a rescue. Example: moving a heavy casualty could place the first aider at risk of injury

1

Some hazards can be controlled by the first aid provider. When controlling hazards, keep the following principles in mind:

- Use mechanical means whenever possible (broom, dustpan, tools, etc.)
- Be careful when lifting or moving objects on or near a casualty
- Have someone assist you where possible
- Turn on lights where no other risks to doing so exist
- Ensure safe footing – many injuries to first aiders are a result of slips and falls.

Hazards that require specialized training to control (electrical hazards, fire, gases, etc.) should only be controlled by those who are properly trained. Most workplaces that deal regularly with these types of hazards will have a specialized response team. Refer to your workplace's policies and protocols.

When dealing with chemical hazards, a Safety Data Sheet (SDS/MSDS) should be accessible and will provide information on how to control the hazards along with first aid directions.

Preventing infection

Airborne pathogens

Examples of infections that can be spread through the air are:

- **Meningitis** is a bacterial or viral infection which causes swelling that affects the spinal cord and brain
- **Tuberculosis** is a bacterial infection that primarily affects the lungs, but can affect any part of the body
- **Influenza**, or "the flu," is a viral infection which is easily spread, and can vary from being mildly debilitating to fatal

Body fluid and blood-borne pathogens

Exposure to blood or body fluids (i.e. vomit, feces) poses a health risk to first aiders. There are three diseases that first aiders should be aware of:

- **Human immunodeficiency virus (HIV)** is the virus responsible for AIDS. There is no vaccine to protect people from this virus. The best defence remains adequate

protection to help prevent infection.

- **Hepatitis B** is one of the three common forms of hepatitis, a viral disease that can cause severe liver damage. Some people who have Hepatitis B have no symptoms but are still contagious. There is a vaccine to prevent Hepatitis B.
- **Hepatitis C** causes much of the same liver damage as Hepatitis B, but there is currently no vaccine available to prevent this disease.

Sharp objects

If a sharp object touches infected blood and then pricks or cuts your skin, you could become infected. First aiders do not use sharp objects like scalpels and needles, but there may be broken glass or other sharp objects that have been in contact with blood or other bodily fluids. Always wear gloves and handle sharp objects with extreme care.

Personal Protective Equipment

Personal Protective Equipment (PPE) is clothing and equipment used to protect the first aider and to minimize the risks of health and safety hazards when in contact with a casualty. PPE can be gloves, a pocket mask used for ventilations, a helmet, eye protection, safety boots, etc.

Use a face mask or shield when providing artificial respiration or CPR. Always follow the manufacturer's directions for disinfecting and cleaning reusable items. Single-use masks, one-way valves, and gloves are disposed of by double bagging with other contaminated articles. If used in the workplace, follow provincial/territorial and/or company protocols for disposal of hazardous items.

Disposable gloves prevent direct hand contact between the first aider and the casualty. Wear gloves when you might touch blood, bodily fluids, tissue or anything that has come in contact with one of these.

If you tear a glove, wash your hands as soon as possible, and put on a new pair. Dispose of contaminated gloves by sealing them in a plastic bag and double-bagging them.

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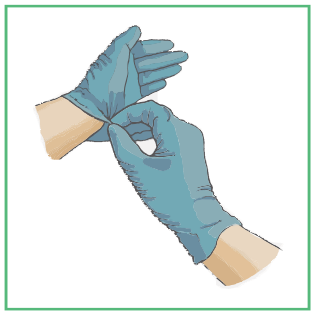
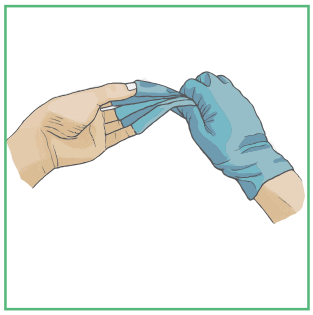
How to remove gloves

Once gloves have been used, they are contaminated and are a possible source of infection. Take them off without touching their outer surface following the steps below.



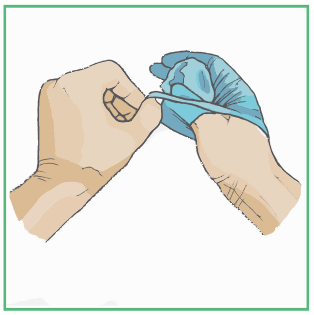
Grasp the cuff of one glove

Pull the cuff towards the fingers, turning the glove inside out.



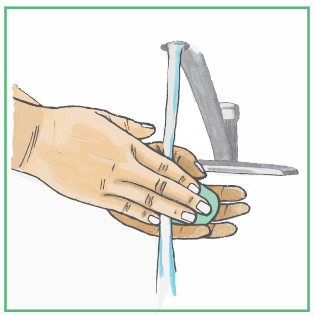
As the glove comes off, hold it in the palm of your other hand.

Slide your fingers under the cuff of the other glove.



Pull the cuff towards the fingers over the first glove.

Tie a knot in the top of the outer glove and dispose of properly—see below.



Wash your hands with soap and running water as soon as possible.

Proper Disposal

Seal the used gloves in a plastic bag and put them in your household garbage.

Check with health professionals or your first aid instructor for specific regulations in your area.

Protecting the first aider

Areas of the body that may have come into contact with a casualty need to be cleaned with hot, soapy water, an anti-septic solution, or a mixture of bleach and water (at a ratio of 1:10). Spills should be cleaned, then sanitized with the bleach and water solution for 20 minutes.

Anyone who has been exposed to possible contaminants should take a hot shower with soap and rinse thoroughly. Anyone who has been exposed to contaminants from a needle stick or sharps injury should seek medical attention.

If an injury occurs due to violence, or a first aider and/or casualty becomes at risk due to violence, you must protect yourself and call for help. Your skills as a first aider are valuable only when the area is safe.

Clean up

After an emergency, it is important to clean-up the area and equipment used properly. Any hard surfaces should be disinfected. Fabrics, where possible, should be laundered. Porous surfaces or materials that cannot be laundered may need to be disposed of.

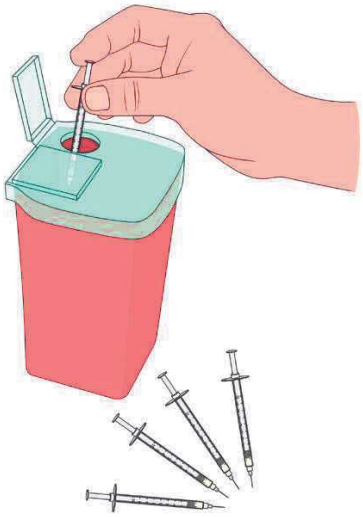
- Items intended to be reused (scissors, forceps) should be wiped of blood and fluids, immersed in a 10% bleach solution (or other disinfecting solution) for 10 minutes, then rinsed and dried
- One-time use items (gauze, gloves) should be put into a garbage bag and tied. That garbage bag can then be put into the regular garbage.
- Any surfaces contaminated by blood or other fluids should be cleaned with a bleach solution or other disinfecting solution

Sharps

In an emergency, sharp objects (or "sharps") may be the cause of the injuries, or used in the first aid. It is important to dispose of these sharp objects properly for both the safety of first aid providers and others. Sharps can include needles, knives, and broken glass. These items may contain contaminated blood and can cut the first aider, exposing them to the contamination.

1 Cleaning up glass should always be done with mechanical means such as a broom and dustpan. The cleaned up glass should be placed in a puncture-proof container like a cardboard box.

When handling knives, always grasp by the handle and carried blade down. Cleaning knives should follow the steps above for hard surfaces.



Needles should be disposed of in a sharps container. These plastic containers have thick walls and a secured lid that prevents accidental punctures. Ambulances will carry sharps containers and any needles found or used during an emergency can be placed in these containers. Always handle needles by the barrel (the plastic part with the plunger) and never try to re-cap a used needle.

Needles must never be disposed of into the general garbage.

Help at the emergency scene

Bystanders should be asked to leave unless asked to stay and assist.

Other first aiders may offer to help. Identify yourself and accept their assistance. If someone is more qualified to handle the situation, you may ask that person to take control.

First responders include ambulance personnel, police officers and firefighters. They will take charge of the scene as soon as they arrive.

Other authorities may be called to the scene (e.g. an electrical utility crew may arrive if there are downed power lines). Identify yourself and continue giving first aid.

Off-duty doctors, nurses and other health professionals may identify themselves and offer to help.

Ten ways a bystander can help

1. Make the area safe
2. Find all the casualties
3. Find a first aid kit
4. Control the crowd
5. Call for medical help
6. Help give first aid, under your direction
7. Gather and protect the casualty's belongings
8. Take notes
9. Reassure the casualty's relatives
10. Lead the paramedics to the scene of the emergency

Signs and symptoms and mechanism of injury

When referring to injuries, first aiders need to understand **signs and symptoms.**

- A **sign** is something we can see, feel, hear or smell (e.g. bleeding, bruising, agonal breathing, skin discolouration).
- A **symptom** is something the casualty is feeling (e.g. nauseous, weakness, pain) and must tell you.

Mechanism of injury encompasses both what happened to the casualty, and how the injury has affected the casualty. It identifies the cause of the injury. Mechanisms of injury that require an ambulance right away:

- A fall from 6.5 meters (20 feet) or more
- A vehicle collision with signs of a severe impact
- Severe damage to the inside of the vehicle, a bent steering wheel, or a broken windshield
- Casualty was thrown from a vehicle
- The vehicle has rolled over
- Casualty was struck by a vehicle
- Crush injuries

1

When any of these mechanisms are apparent, call an ambulance as soon as you can. When we understand the cause of the injury, we are able to predict what injuries may be present and what injuries are not likely, even in situations in which there are no visible signs of injury and/or the casualty is unable to describe their symptoms.

Signs and symptoms

Examples of Signs and Symptoms	
Signs you can see	Blood, deformity, bruising, unequal pupils, painful expression and/or flinching, sweating, wounds, unusual chest movement, skin colour, swelling, foreign bodies, vomit, incontinence
Signs you can hear	Noisy or distressed breathing, groans, sucking wounds (chest injury), bones scraping together, quality of speech
Signs you can feel	Dampness, skin temperature, swelling, deformity
Signs you can smell	Casualty's breath (fruity breath, acetone/nail polish breath, or alcohol), vomit, incontinence, gas fumes, burning, solvents or glue
Symptoms the casualty may tell you about	Pain, fear, heat, cold, loss of normal movement, loss of sensation, numbness, tingling sensation, thirst, nausea, faintness, stiffness, feeling faint, weakness, memory loss, dizziness, sensation of a broken bone

The importance of medical help

In first aid, any type of medical care is referred to as medical help. Unless an injury is very minor, you should always make sure the casualty receives medical help following first aid. Medical help may be given at the scene, en route to a medical facility, or in a hospital.

Know the EMS telephone number for your community. This is often 9-1-1 in urban areas. If you are outside of your community, find the EMS phone numbers in the first few pages of the telephone book, or search online.

Calling for medical help is important. The period immediately following a severe, life-threatening injury is known as the **golden hour**. This time is "golden" because the faster a casualty makes it to a hospital emergency room or operating room, the better the chances of survival and recovery.

You can ask a bystander to call for medical help. Provide the person with:

- Necessary phone number
- A description of the casualty's condition
- Directions to follow to reach the scene
- Instructions to report back to you after getting medical help

If you are alone, you must decide whether to stay with the casualty or leave to get help. The correct decision will depend on the specifics of the situation. If you have a mobile phone, call from the scene and perform first aid with the dispatcher's assistance.

Medical care

As a first aider you are not trained to diagnose the nature and extent of an injury or illness; a medical doctor has the training to do this. As a rule, make sure the casualty receives medical care following first aid. For minor injuries, this may not be necessary. **Medical care** is either given by a medical doctor or under the supervision of a medical doctor. Paramedics give medical care because they work under the supervision of medical doctors. Medical care is given in hospitals but it can also be given at the emergency scene or on the way to a medical facility.

1 Call an ambulance or drive the casualty to the hospital?

Always call an ambulance if you can; only transport the casualty to medical help yourself if that is the only possible way to get medical help. Transporting an injured person is often difficult and time-consuming. An ambulance or other rescue vehicle is well-equipped, and the casualty can begin receiving medical help as soon as it arrives.

When an ambulance arrives, do not stop the first aid you are providing until the crew has arrived to the casualty and indicates they are ready to take over. Give a short report to the ambulance crew on the situation; the condition of the casualty; and what you have done so far.

Use **MIST** to help remember what to report:

M – Mechanism of Injury

I – Injuries or illnesses found

S – Signs and symptoms

T – Treatment (first aid) provided so far

The Good Samaritan principles only protect you when giving care at the scene of the emergency, or while transporting the casualty when this is needed to save the casualty's life and medical help is not available. Transporting the casualty unnecessarily leaves you liable if it results in further injury should an accident or incident occur while en route to a hospital or medical station.

Good communication

Communication is necessary in every emergency situation, regardless of the details. As the first aider, there are many people you may need to communicate with – the casualty, bystanders, family members, other first aiders, EMS providers, and other professionals (e.g. police, fire, hydro). Effective communication skills will help you to assess the casualty's condition, and explain what you are doing and why.

Some rules for effective communication:

- Be calm and direct
- Be respectful
- Do not use medical terms
- Call the casualty by name
- Do not diagnose the casualty's condition
- Always be honest, reassuring, and choose your words carefully

As a first aider, the first thing you do when you arrive at an emergency scene is take charge of the situation. You stay in charge until you hand control of the scene over to more qualified people. While in charge, many other people may offer to help.

When handing the scene over to someone other than the casualty, describe the complete history of the incident and pass along any notes you have taken. Be sure to include:

- Your name
- The time you arrived
- The history of the illness or injury, including signs and symptoms observed
- What first aid has been given
- Any changes in the casualty's condition since you took charge

Principles of communication

Though each situation is different, the following general guidelines help improve communication.

1

Focus

Maintain your attention on the casualty. Position yourself at eye level and maintain eye contact.

Terminology

Refrain from using medical terminology when communicating with the casualty or bystanders. Explanations and answers must be clear, concise and easily understood.

Body Language

Refrain from using body language that could be perceived as threatening or aggressive.

Professionalism

Always maintain your professionalism. Explain everything you are doing and why. If what you are doing may be painful, let the casualty know.

Barriers to communication

Despite following the principles of communication above, there are certain barriers that may arise making communication difficult.

- **Language –** the casualty or bystanders may not speak the same language as the first aid provider
- **Physical** – the casualty or bystanders may have a hearing, speech, or visual impairment
- **Cognitive –** the casualty or bystander may not understand the questions or requests
- **Cultural** – different cultures approach interactions with others which may impact communication
- **Environment –** noisy situations can make communication very difficult
- **Technical** – failure or limitations of communication devices (radios, phones) can hinder communication

When faced with these barriers, the first aid provider may have to attempt several different ways to gather information or give directions.

First aid providers should also remember to keep things simple, clear, and to the point. Drawn out descriptions using large words can make it very difficult for the casualty or those around to understand. An example would be "Get me the AED" instead of "I need you to find an Automated External Defibrillator so I can perform cardiopulmonary resuscitation."

Injuries and illnesses

Injuries

When something from outside the body damages tissues, the damaged area is called an injury. How serious an injury is depends on:

- **What tissues are injured**—an injury to a vital organ, or tissues of a vital system, like the nervous system, is serious
- **How bad the injury is**—for instance, a bone broken in half may not be as serious as the same bone shattered into many pieces
- **How much tissue is injured**—a burned hand may be more serious than a burned finger Injuries and energy

Injuries and energy

Injuries result from too much energy being applied to the body. For instance:

- A thermal burn is caused by too much heat energy
- An acid burn is caused by too much chemical energy
- Snow-blindness is caused by too much light energy
- A broken bone is caused by too much mechanical energy
- A stopped heart from an electric shock is caused by too much electrical energy

The body can take a certain amount of energy without being injured. But too much of any sort of energy will cause injury. Three factors determine whether an injury will occur. They are:

- How intense the energy was
- How long the energy was applied to the body
- What part of the body the energy was applied to

1

Most injuries are caused either by something hitting the body or the body hitting something—this is mechanical energy. When something moves, it has mechanical energy. How much mechanical energy something has depends on how fast it is moving and how much it weighs.

Illness

We often think of first aid in the context of injuries only. But when someone becomes very sick, the result can be a medical emergency in which first aid can save a life.

Some illnesses, like heart attacks or strokes come on very fast. Other illnesses progress more slowly and it can be hard to decide exactly when you have a medical problem that calls for a doctor's attention.

Get medical help when any of the following is present:

- Sudden severe pain in any part of the body
- Sudden changes in vision, headache or dizziness
- Severe or persistent diarrhea or vomiting
- Sudden weakness or slurred/jumbled speech
- Persistent high temperature
- Changes in level of consciousness
- Rash of unknown origin
- Repeated fainting
- Obvious depression, suicide threats or attempts
- Whenever you are very worried about yourself or someone in your care

If the casualty is an infant, the following are also reasons to get medical help (in addition to the reasons above):

- The baby has had a seizure
- The baby is blue or very pale
- You think the baby is having trouble breathing
- The baby cries a lot, or won't stop crying

Stress management in emergency situations

First aiders may experience a certain level of stress as a result of the assistance they provide. Stress is the body's normal reaction to physical and psychological events. It can be seen in certain attitudes and behaviours in both casualties and first aiders. It is a biological response and may be reflected in:

- An increase in heart rate
- An increase in blood pressure
- An increase in blood sugar
- Dilation of the bronchi and pupils

Possible reactions of casualties

Casualties may react to stressors in different ways and first aiders must observe and adjust to such reactions which can include:

- **Denial**—the casualty may deny the seriousness of the situation and refuse assistance
- **Resignation**—the casualty may be resigned to dying even if their life does not seem to be in danger, and doesn't want to make any effort to do what is needed
- **Aggressiveness**—the casualty may be hostile
- **Assertiveness**—the casualty is positive, cooperative, and may even want to take charge of their own care including directing the first aiders

Stress management

Managing stress in an emergency situation can make a significant difference in the quality of first aid provided. Appropriate mental preparation and regular first aid skill practice can help first aiders react effectively when faced with an emergency situation. The negative impact of stress can be reduced by understanding it and taking measures to try and overcome it. After serious incidents, it is important for first aiders to process their emotions.

When faced with a highly stressful situation some first aiders may experience prolonged effects of stress and they should seek medical assistance.

Chapter 2

Emergency Scene Management

- Four steps in ESM
- Step one: scene survey
- Step two: primary survey
- Step three: secondary survey
- Step four: ongoing casualty care
- Shock
- Fainting
- Multiple casualty management (triage)
- Lifting and moving

Chapter 2 Emergency scene management

2

Emergency scenes generally begin with confusion as people realize there is an emergency unfolding in front of them. No one knows what to do first, who should be in charge, or how they can help. In this situation, the first aider needs to follow a sequence of actions that ensures safe and appropriate first aid is given and everyone's safety is protected. First aiders use emergency scene management (ESM) to do this. Emergency scene management is the sequence of actions you should follow to ensure safe and appropriate first aid is given.

Steps of ESM

1. **Scene survey**—during the scene survey you take control of the scene, find out what happened and make sure the area is safe before assessing the casualty.
2. **Primary survey**—assess each casualty for life-threatening injuries and illnesses, call or send someone to call 9-1-1, and give life-saving first aid.
3. **Secondary survey**—the secondary survey is a step-by-step way of gathering information to form a complete picture of the casualty's overall condition.
4. **Ongoing casualty care**—during ongoing casualty care you continue to monitor the casualty's condition until medical help takes over.

These steps are generally done in the order above. The initial scene survey, primary survey and the start of life-saving first aid usually happens within one or two minutes. The secondary survey is not always necessary.

Scene Survey

- Take charge of the situation
- Call out for help to attract bystanders
- Assess hazards and make the area safe
- Find out the history of the emergency, how many casualties there are and the mechanism(s) of injury
- Identify yourself as a first aider and offer to help, get consent
- Assess responsiveness

Send or go for medical help as soon as you identify a serious problem and then begin the primary survey. If you have a mobile phone, you can dial 9-1-1 or your local emergency number, and put the device on speaker phone, if possible. This allows the first aider to remain with the casualty.

Primary Survey

Check for life-threatening conditions, the ABCs:

A = Airway

B = Breathing

C = Circulation

The sequential steps of the primary survey should be performed with the casualty in the position found unless it is impossible to do so.

The primary survey should begin immediately after the scene survey.

Check the airway

If the casualty is conscious, ask "what happened?" How well the casualty responds will help you determine if the airway is clear. Use a head-tilt-chin-lift to open the airway of an unresponsive casualty.

If you suspect a head or spinal injury, **and have been trained**, use a jaw-thrust without head-tilt.

Check for breathing

- If the casualty is conscious, check by asking how their breathing is.
- If the casualty is unconscious, check for breathing for at least five seconds, and no more than 10 seconds. If breathing is effective, move on to check circulation. If breathing is absent or ineffective (gasping and irregular, agonal), begin CPR.

Check circulation

- Control obvious, severe bleeding
- Check for shock by checking skin condition and temperature
- Check with a rapid body survey for hidden, severe, external bleeding and signs of internal bleeding

Rapid body survey

The rapid body survey is a quick assessment of the casualty's body which is performed during the primary survey. By running your hands over the casualty's entire body from head to toe (and under heavy outwear), you are able to feel for severe bleeding, internal bleeding and any obvious fractures.

When performing the rapid body survey:

- Wear gloves when possible, and check gloves for blood every few seconds
- Be careful not to cause any further injuries while performing the survey
- Look at the casualty's face to notice any responses to the rapid body survey

Provide first aid for life-threatening injuries or conditions.

- Maintain an open airway with a head-tilt chin-lift or by placing the unresponsive breathing casualty into the recovery position
- Provide CPR if the unresponsive casualty is not breathing or not breathing normally (gasping)
- Control severe bleeding
- Provide support for obvious fractures
- Give first aid for shock by providing first aid for life-threatening injuries and maintaining the casualty's body temperature
- Evaluate the situation and decide whether to do a secondary survey

Do a secondary survey if:

- The casualty has more than one injury
- Medical help will be delayed more than 20 minutes
- Medical help is not coming to the scene and you have to transport the casualty

If you do not do a secondary survey, steady and support any injuries found and give ongoing casualty care until medical help arrives.

How to turn a casualty face up

You should give first aid in the position in which the casualty is found as much as possible. But sometimes you have to turn a casualty over to assess for life-threatening injuries or to give life-saving first aid

1. Extend the arm closest to you over the head.

2. Tuck the far arm against the casualty's side.

3. Cross the far foot over the near foot.

4. Support the head and neck. Firmly grip the clothing at the waist. Roll the casualty over

5. Position the casualty for giving first aid

ESM when a head or spinal injury is suspected

If you suspect a head or spinal injury, protect the head and neck from any movement. Head or neck movement could result in life-long disability or death. Adjust your first aid to this situation as shown below

1. As soon as you see there might be a head or spinal injury, tell the casualty not to move

2. Once you have consent to help the casualty, steady and support the head and neck. Keep elbows firmly supported on thighs or ground. Then, assess responsiveness.

3. If there is a bystander to help, show them how to support the head and neck so you can continue your assessment.

4. Continue your assessment.

5. If a second bystander is available, show them how to steady and support the feet to prevent movement.

6. Keep the head and neck supported (and the feet if possible) while giving further first aid until handover to medical help.

When **moving a casualty** with a suspected head or spinal injury, move them as a unit as much as possible. This means rolling the head, trunk and legs together, or lifting the whole body at the same time. Do what you can to prevent movement.

Turning a casualty face up when a head or spinal injury is suspected

2

You should give first aid in the position in which the casualty is found as much as possible. But sometimes you have to turn a casualty over to assess for life-threatening injuries or give life-saving first aid

When you suspect a head or spinal injury, turn the casualty as a unit so the head and spine stay in the same relative position

1. The first aider at the head supports the head—placing the right hand along the right side of the casualty's head and the left hand along the left side

2. The other first aider extends the casualty's near arm over their head and gets a good grip on the casualty at the shoulder and waist.
3. At the same time, the two first aiders roll the casualty towards the second first aider.

4. If extra help is available, have the third first aider support the legs to prevent twisting of the neck and spine. With a fourth, put one first aider at the shoulders and another at the waist.

Secondary survey

A **secondary survey** follows the primary survey and any life-saving first aid. It is a step-by-step way of gathering information to form a complete picture of the casualty. In the secondary survey, the first aider is looking for injuries or illnesses that may not have been revealed in the primary survey. You should complete a secondary survey if:

- The casualty has more than one injury
- Medical help will be delayed for 20 minutes or more
- You will transport the casualty to medical help

The secondary survey has four steps:

1. History
2. Vital signs
3. Head-to-toe exam
4. First aid for any injury or illness found

2

History

A **SAMPLE** history is used to gather a brief medical history of the casualty. This information may be useful for health care professionals who will continue to assist the casualty. If the casualty is unable to respond, some of the SAMPLE history could be answered by a close family member.

S = **symptoms –** what the casualty is feeling (such as pain, nausea, weakness, etc.)

A = **allergies –** any allergies, specifically allergies to medications

M = **medications –** any medications or supplements they normally take, have taken in the past 24 hours, or any doses they may have missed

P = **past or present medical history –** any medical history, especially if it is related to what they are experiencing now. Ask if they have medical alert information

L = **last meal** – last meal they ate and when, anything else taken by mouth

E = **events leading to the incident –** what was happening before the injury/illness? How did the injury occur?

Vital signs

There are four vital signs to check on the casualty

1. Level of consciousness (LOC)
2. Breathing
3. Pulse
4. Skin condition and temperature

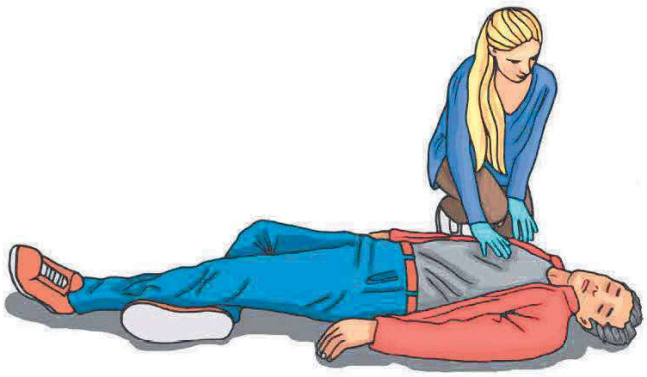
Check your applicable workplace legislation/ regulations

Level of consciousness (LOC)

A common method of obtaining a casualty's LOC is using the acronym **AVPU**. When using AVPU to indicate LOC, it is a scale which ranges from good (A), to not as good (V), to bad (P), to worse (U)

A = **Alert –** An alert casualty will have their eyes open and will be able to answer simple questions. An alert casualty is oriented to person, place and time.

V = **Verbal** – The casualty will respond when spoken to, but may not be able to effectively communicate. They may not be oriented to person, place or time.



P = **Pain –** This casualty will only respond when a painful stimuli is delivered, such as pinching them or rubbing your knuckles on their sternum. They may move or make noise, but they will not communicate.

U = **Unresponsive –** the unresponsive casualty will not respond to any stimulus.

Please note that an alternative to quickly estimate a casualty's LOC is to evaluate their eye, verbal and motor skills. If their eyes are open, they can clearly speak, and obey a command such as "squeeze my fingers," they are alert

Breathing

To assess the breathing rate, watch the casualty closely for a total of 30 seconds. It is OK to place your hand on their upper abdomen to feel the rise and fall. Check the quality of the breathing. Carefully count each breath over the 30 seconds and multiply that number by two for breaths per minute.

Normal breathing rates			
Age	Too slow	Normal	Too fast
Infant	Below 25	30-50	Above 60
Child	Below 15	20-30	Above 40
Adult	Below 10	10-20	Above 30

Pulse

The pulse rate is the number of beats your heart takes in one minute, and it is an essential skill for assessing all casualties. The most common places to assess a pulse is at the wrist or neck, and for infants, the inside of the upper arm.

To assess the pulse, use two fingers and gently place them on either the inside of the wrist (just below the hand on the thumb side), or on the side of the neck (carotid artery), or for infants, the inside of the upper arm, on the brachial artery. Press just gently enough to feel the pulse. You may have to feel around the area until you find it. Once you have found the pulse, count the number of beats over 30 seconds and multiply that number by two.

Normal pulse rates	
Age	Normal pulse range
Infant	120-150
Child	80-150
Adult	60-100

Skin condition and temperature

When assessing the skin we look for the temperature (warm or cold), the colour (normal skin tones or pale) and whether the skin is dry or wet. Use the back of your gloved hand to feel the casualty's forehead and cheeks. If their skin normal, they will have normal skin colour, and their skin will be warm and dry. If the skin is pale, cold and wet (sweaty), this could be an indication of shock.

Head-to-toe exam

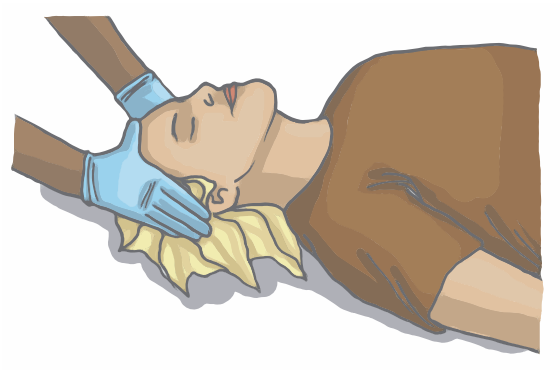
The head-to-toe exam is a complete and detailed check of the casualty for any injuries that may have been missed during the rapid body survey. **Do not examine for unlikely injuries.** You may need to expose an area to check for injuries, but always respect the casualty's modesty and ensure you protect them from the cold. Only expose what you absolutely have to.

- Ask the casualty if they feel any pain before you start. Note any responses.
- Speak to the casualty throughout the process. Explain what you are checking for as you proceed.
- Always watch the casualty's face for any facial expressions that may indicate pain.
- Do not stop the exam. If you find an injury, note it and continue.
- Do not step over the casualty. If you need to, walk around them.
- During a detailed exam, you are looking for all bumps, bruises, scrapes, or anything that is not normal.
- If the casualty is unconscious, look for medic alert devices during your survey, such as a tag, bracelet, necklace, watch, or other indicator.
- Look, then feel

2

Start at the head:

- Check the skull for anything abnormal
- Check the ears for fluid
- Check the eyes, are the pupils the same size?
- Check the nose for drainage
- Check the mouth, are the teeth intact? Are the lips blue or pale?



Check the neck:

- Are the neck veins bulging?
- Is there a medical alert necklace?
- Check the collarbones
- Check the shoulders on both sides

Check the arms:

- Check each arm completely
- Check the fingernails for circulation by squeezing and watching the blood return

- Ask the casualty to squeeze two of your fingers in both hands at the same time. Do they have an adequate strength and is the strength equal?

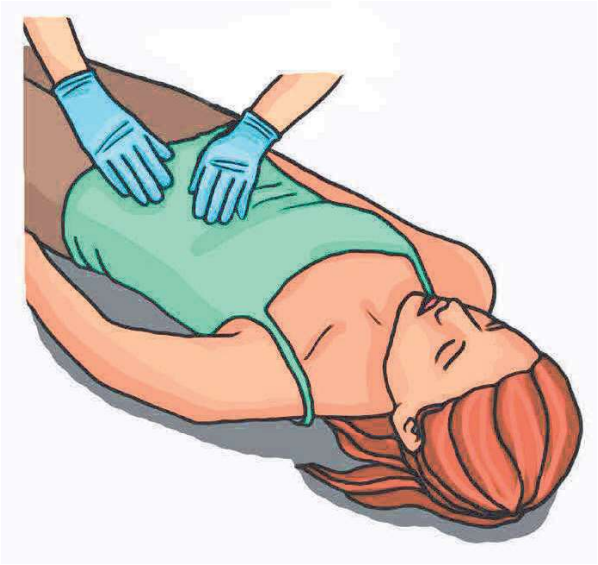
Check the chest and under:

- Does it hurt the casualty to breathe?
- Does the chest rise and fall with breaths as it should?
- Reach around the back as far as you can

Check the abdomen and under:

2

- With flat hands, check the abdomen carefully
- Do not push into the abdomen. Gently feel for pain, tenderness, or rigidity
- Place a flat hand on their abdomen and ask the casualty to push against it. Does this cause pain?
- Reach around the back as far as you can



Check the pelvis:

- Place your hands on top of the pelvic bones and very gently squeeze for stability

Check the legs, ankles, and feet:

- Check each leg completely one at a time
- Is one leg shorter than the other?
- Carefully check the stability of the kneecap and under the knee
- Squeeze or pinch a foot. Ask the casualty what you just did to see if they answer correctly.
- Place both hands on both feet. Ask the casualty to push and then pull against you. Feel for equal strength. Ask the casualty to wiggle their toes and watch for the response.
- Check circulation

First aid for injuries found

When you have completed your exam, give appropriate first aid for any injuries or illnesses found. If the casualty has more than one injury, give first aid to the more serious injuries first.

Document

Upon completion of the secondary survey, document your findings as accurately as possible. This information may be valuable to medical professionals who will continue to assist the casualty.

Documentation is also important in a workplace emergency as it may be used as part of an investigation. Documentation of the incident and the first aid given should be completed on pre-printed forms and maintained as required by provincial regulations/ legislation for reference by investigators.

Ongoing casualty care

Once first aid for injuries and illnesses that are not life threatening has been given:

- The first aider will hand over control of the scene to the casualty, or someone else, and end their involvement in the emergency
- The first aider will stay in control of the scene and wait for medical help to take over, or
- The first aider will stay in control of the scene and transport the casualty to medical help

The first aid must maintain the casualty in the best possible condition until handover to medical help by:

- Giving first aid for shock
- Position the casualty based upon their condition
- Monitoring the casualty's condition
- Recording the events of the situation
- Reporting on what happened to whoever takes over

Instruct a bystander to maintain manual support of the head and neck (if head/spinal injuries are suspected). Continue to steady and support manually, if needed.

Recovery Position

This position protects the casualty and also reduces bending and twisting of the spine. This position protects the airway if you must leave the casualty.

1. Position the arm closest to you at 90 degrees in front of the casualty, keeping it out of the way when rolling them.

2. Position the arm furthest from you on the casualty's chest. Bend the far knee.

3. Reach behind the casualty's shoulder and roll casualty towards you by pulling on the far knee.

4. Adjust the position of the arms and leg so the casualty is in a stable position. Place the far arm at 90 degrees to the casualty with the palm down.

5. Give ongoing care.

After the handover

In first aid, we prepare ourselves to care for an injured or ill person. We don't often think about what happens after the casualty has left our care. Immediately following the handover of the casualty you may have a number of practical details to attend to. These details can include cleaning up after the emergency, correcting any unsafe conditions that caused the injury, or making a report on the incident and your involvement.

Once these practical matters are out of the way, we expect things to "return to normal." However, you will likely find yourself thinking about the situation and the details of what happened while you were involved. Following a stressful event, many people review the details and try to evaluate what they did and how they could have done it better.

This reviewing of the events is completely normal and you can expect it to happen. But if thoughts of the incident continue for many weeks, or if they affect your day-to-day life, you may be experiencing the negative effects of critical incident stress (CIS).

Critical incident stress is a common reaction to a stressful emergency situation. The effects of CIS can interfere with your daily life—your job, your relationships, your peace of mind. If this happens to yourself, you need to do something about it, and help is readily available. Start by talking to your family doctor or a doctor at a walk-in clinic. A doctor will understand what you are going through and will suggest a course of action.

The effects of critical incident stress can appear many weeks, months or years after the event.

Shock

Shock is a circulation problem where the body's tissues don't get enough oxygenated blood.

Shock is a danger because any physical injury or illness can be accompanied by shock, and it can quickly progress into a life-threatening condition. Pain, anxiety and fear do not cause shock, but they can make it worse, or make it progress faster. This is why reassuring a casualty and making them comfortable is important.

Medical shock should not be confused with electrical shock or being shocked and surprised. Medical shock is life-threatening, as the brain and other organs cannot function properly.

The following information provides some causes of shock. Severe shock can also result from medical emergencies such as diabetes, epilepsy, infection, poisoning or a drug overdose.

*For casualties with dark skin colour, the colour changes may be observed in the following areas of the body: lips, gums and tongue, nail beds and palms, earlobes, membrane of the inner eyelid.

Common causes of severe shock	
Cause of shock	**How it causes a circulation problem**
Severe bleeding - internal or external (includes major fractures)	Not enough blood to fill blood vessels
Severe burns	Loss of blood plasma (fluid) into tissues—not enough blood to fill blood vessels
Crush injuries	Loss of blood and blood plasma into tissues—not enough blood to fill blood vessels
Heart attack	Heart is not strong enough to pump blood effectively
Spinal cord or nerve injuries	Brain can't control the size of the blood vessels—the blood can't get to the tissues properly
severe allergic reactions	Many things can be affected—breathing, heart function, etc.

Signs and symptoms of shock	
Signs	**Symptoms**
• Pale skin at first, turns blue-grey*	• Restless
• blue-purple lips, tongue, earlobes, fingernails	• Anxious
• Cold and clammy skin	• Disoriented
• Breathing shallow and irregular, fast or gasping for air	• Confused
• Changes in level of consciousness	• Afraid
• Weak, rapid pulse—radial pulse may be absent	• Dizzy
	• Thirsty

First aid for shock

The following actions will minimize shock:

1. Give first aid for the injury or illness that caused the shock
2. Reassure the casualty often
3. Minimize pain by handling the casualty gently
4. Loosen tight clothing at the neck, chest and waist
5. Keep the casualty warm, but do not overheat — use jackets, coats or blankets if you have them
6. Moisten the lips if the casualty complains of thirst. Don't give anything to eat or drink. If medical help is delayed many hours, give small amounts of water or clear fluids to drink — make a note of what was given and when
7. Place the casualty in the best position for their condition Continue ongoing casualty care until handover

The above first aid for shock may prevent shock from getting worse. Whenever possible, add these steps to any first aid you give.

Positioning a casualty in shock

Putting the casualty in the right position can slow the progress of shock and make the casualty more comfortable.

The position you use depends on the casualty's condition. The casualty should be as comfortable as possible in the position you use.

No suspected head/spinal injury; fully conscious

Place the casualty on their back, if injuries permit. Once the casualty is positioned, cover them to preserve body heat, but do not overheat.

No suspected head/spinal injury; less than fully conscious

Place the casualty in the recovery position. When there is decreased level of consciousness, airway and breathing are the priority—the recovery position ensures an open airway.

Conscious with a breathing emergency and/or chest pain

If a conscious casualty is experiencing chest pain or is having difficulty breathing, have them sit in a semi-sitting position, or any position that makes breathing easier for them.

Suspected head/spinal injury

If you suspect a head or spinal injury, steady and support the casualty in the position found. This protects the head and spine from further injury. Monitor the ABCs closely.

As injuries permit

A casualty's injuries may not permit you to put them into the best position. Continue to support the head and neck and, if needed, use a head-tilt chin-lift to maintain the open airway. Always think of the casualty's comfort when choosing a position.

Fainting

Fainting is a temporary loss of consciousness caused by a shortage of oxygenated blood to the brain. Common causes of fainting include:

- Fear or anxiety
- Lack of fresh air
- Severe pain, injury or illness
- The sight of blood
- An underlying medical problem
- Fatigue or hunger
- Long periods of standing or sitting
- Overheating

A person who has fainted is unconscious. Place them in recovery position to protect the airway and prevent possible choking. Place the casualty in a comfortable position as they regain consciousness.

First aid for fainting

- Ensure a supply of fresh air and loosen tight clothing at the neck, chest and waist.
- Make the casualty comfortable as consciousness returns and keep them lying down for 10 to 15 minutes. Continue to monitor breathing and consciousness.

Do not assume a person has "just fainted," unless there is a quick recovery. If the recovery is not quick or complete, stay with the casualty until medical help takes over.

If you have to leave to get medical help or you have to give first aid to other casualties, turn the casualty into the recovery position being as careful as you can if there are any injuries.

Feeling faint or "impending faint"

Sometimes when a person is about to faint, there are warning signs. The person:

- Is pale
- Is sweating
- Feels sick, nauseous, dizzy or unsteady

First aid for an impending faint

1. Place the casualty on their back.
2. Ensure a supply of fresh air—open windows or doors.
3. Loosen tight clothing at the neck, chest and waist.
4. Stay with the casualty until they has fully recovered.

Decreased level of consciousness (LOC)

Consciousness refers to the level of awareness one has of themselves and their surroundings. There are different levels of consciousness ranging from completely conscious to completely unconscious. Many injuries/illnesses can cause changes in a casualty's level of consciousness, including:

- A breathing emergency
- A heart attack
- A head injury
- Poisoning
- Shock
- Alcohol or drug abuse
- Medical condition (epilepsy, diabetes, etc.)

Semi-consciousness and unconsciousness are breathing emergencies for casualties lying on their back, because the tongue may fall to the back of the throat and block the airway. Saliva and other fluids can also pool at the back of the throat and choke the person.

A progressive loss of consciousness means the casualty's condition is getting worse. Always monitor a casualty's level of consciousness and note any changes. A first aider can use the acronym AVPU (alert, verbal, pain, unresponsive) to assess and describe levels of consciousness.

Decreased consciousness is always an urgent situation. The person can quickly become unconscious, and this is a breathing emergency. When you recognize decreased consciousness, get medical help as quickly as possible.

First aid for unconsciousness

1. Start ESM. Perform a scene survey. Call or send for medical help as soon as unresponsiveness is determined.

2. Do a primary survey.

3. Do a secondary survey if necessary.
4. Turn the casualty into the recovery position, if injuries permit. Give ongoing care.

If injuries make it necessary for the casualty to be face up, monitor breathing continuously. If necessary, hold the airway open. Always ensure an open airway.

Loosen tight clothing at the neck, chest and waist, and continue ongoing casualty care until handover. Record any changes in level of consciousness and when they happen.

A decreased level of consciousness also requires urgent medical help.

Multiple casualty management (triage)

The process of making decisions at an emergency scene where multiple people are injured is called **triage**. In triage, first aiders quickly examine all casualties and place them in order of greatest need for first aid and for transportation. The idea is to do the most good for the greatest number of casualties.

Casualties are categorized into three levels of priority:

- **Highest priority**—casualties who need immediate first aid and transportation to medical help
- **Medium priority**—casualties who probably can wait one hour for medical help without risk to their lives
- **Lowest priority**—casualties who can wait and receive first aid and transportation last, or casualties who are obviously dead

Note: in the event of a lightning strike, where more than one person is injured, the principles of multiple casualty management are reversed. Give first aid to unresponsive non-breathing casualties since the casualties that are still breathing are recovering.

2

The first aid priorities for injuries		
Priority	**Condition**	**Causes**
High priority Airway	Foreign body blocking airway	Choking on food
	Tongue or fluids blocking airway	Unconscious, lying on back
	Swollen airway	Allergic reaction, airway infection
High priority Breathing	Injured chest and/or lungs	Chest injury, broken ribs
	Brain not controlling breathing properly	Poisoning, drug overdose, stroke, electric shock
	Not enough oxygen reaching blood	Not enough oxygen in air, carbon monoxide poisoning
High priority Circulation	Severe bleeding	External bleeding or internal bleeding
	Severe shock	Bleeding, serious illness, poisoning
Medium priority Injuries that have potential for life-long disability	Fractures that could affect breathing	Broken ribs, shoulder blade
	Fractures—open, severe or multiple bones	Broken upper leg, pelvis, crushed arm
	Head/spinal injuries	Fall from a six-foot ladder
	Critical burns	Critical burns to the hands
Low priority Minor injuries or obviously dead	Minor fractures	Broken lower leg, lower arm, hand, finger, etc.
	Minor bleeding	Bleeding not spurting or free-flowing
	Non-critical burns	Moderate degree burns to the forearms
	behavioural problems	Grief or panic
	Obviously dead	Obvious massive injuries, no pulse or other signs of circulation

Triage sequence of actions

Begin ESM

- Determine how many casualties there are in the scene survey.

Start with the nearest casualty, and move outward

- Do a primary survey
- Give first aid for life-threatening injuries
- If the person is obviously dead, go to the next nearest casualty

Repeat step 2 for each casualty

- Always move to the next nearest casualty

Categorize

- Decide which casualties have the highest priority, second priority, and lowest priority.

Arrange transportation

- Arrange for the highest priority casualties to be transported to medical help as soon as possible

Perform secondary survey

- Begin with the highest priority. Give appropriate first aid, and move on

Give ongoing care for each casualty until transported

In a multiple casualty situation, constantly assess the casualties and the situation and make changes to priorities.

Lifting and moving

Always try to give necessary first aid where the casualty is found, then wait for the paramedics to move the person. However, there are times when this is not possible.

You may have to move a casualty when:

- There are life-threatening hazards to yourself or the casualty e.g. danger from fire, explosion, gas or water
- Essential first aid for wounds or other conditions cannot be given in the casualty's present position or location
- The casualty must be transported to a medical facility

If life-threatening hazards make it necessary to move a casualty right away, you may need to use a rescue carry.

In urgent and dangerous situations where casualties are moved with less than ideal support for injuries, the casualty's injuries may be made worse by improper movement and handling. The chance of further injury can be reduced with proper rescue carry techniques.

Always move the casualty the shortest possible distance to safety and to provide essential first aid. Use bystanders to help you and support any injuries the best you can during the move. Keep the risks to the casualty, yourself and others to a minimum.

Rolling Cots (Stretchers)

If your workplace uses rolling cots to transport injured workers, it is crucial that you have proper training on how to operate and handle the cot before you use it. Failure can result in the cot tipping or dropping, and causing further injury.

Occupational Hazards

When working in and around occupational hazards such as confined spaces, trenches, machinery, and hazardous gases, workers should know the proper response protocols. Ensure you have the appropriate training for the type or rescue you will be undertaking as well as the proper equipment to keep yourself safe while rescuing another worker.

Helicopters

In some locations, a helicopter may be sent to transport an injured worker to hospital. Anyone working around helicopters should have proper training and everyone should follow these guidelines:

- Never approach without permission of the pilot or crew chief
- Always follow directions from the pilot or crew chief on from which direction to approach the aircraft
- Know the restricted and danger areas around the aircraft and remain outside these areas unless you need to enter
- The tail and tail-rotor of the helicopter poses a significant danger and should be avoided

Transporting a casualty

Generally speaking, first aid providers will not transport casualties to the hospital, leaving that to ambulances. However, there are instances where you may choose to transport someone to the hospital yourself.

- The injuries are minor and the casualty is stable
- The response time for EMS to arrive is prohibitively long (i.e. remote areas)
- If the above conditions are met, and the casualty is a family member or close friend—do not transport strangers to the hospital in your own vehicle whenever possible

Care during transport

Every effort must be taken to ensure that injuries are not made worse while transporting a casualty to a medical facility. Take steps to keep the casualty comfortable and in a position that will not cause unneeded movement of injured limbs. Have another person accompany you to monitor the casualty if possible.

Do not drive fast. If a casualty needs to be transported quickly, an ambulance should be called. Follow all local traffic laws. Find the smoothest route possible to make the ride as comfortable as possible.

Meeting an ambulance crew enroute

2

Some work locations are isolated and response times of EMS are extended. In these instances, where provincial regulations permit, casualties can be transported toward medical help with the plan to meet an ambulance part way. When selecting a meeting point, be sure the location is clear to both sides and it is easily found. Identify any landmarks or businesses that can aid in finding the location. In the event you arrive before the ambulance, contact EMS and get an update on the ambulance location before moving the meeting location.

Lifting techniques and proper body mechanics

Moving any casualty from an emergency scene poses dangers to the rescuer as well as the casualty. If the casualty must be moved, select the method that will pose the least risk to the casualty and to you. You can be of little help to a casualty if you injure yourself in the rescue.

Using incorrect body mechanics in lifting or moving a casualty may leave the rescuer suffering muscle strains. Use the following lifting guidelines:

- Stand close to the object to be lifted.
- Bend your knees, not your waist.
- Tilt the object so that you can put one hand under the edge or corner closest to you.
- Place your other hand under the opposite side or corner, getting a good grip on the object.
- Use your leg muscles to lift, and keep your back straight.
- When turning, turn your feet first; don't twist your body.

When lowering the object, reverse the procedure.

Rescue carries

A rescue carry is an emergency method of moving a casualty over a short distance to safety, shelter or to transportation. Select the type of carry based on the circumstances.

- The size and weight of the casualty relative to the rescuer
- The number of rescuers available to assist
- The type of injury
- The distance to move the casualty

Whenever possible, ask one or more bystanders to help you. When help is available:

- Remain with the casualty
- Give instructions to the bystanders about what to do and what safety precautions to take
- Fully coordinate the rescue activities

Drag carry

This carry is used by the single rescuer to drag a casualty who is either lying on their back or in a sitting position. The drag carry provides maximum protection to the head and neck, and therefore should be used when you are moving a casualty with this type of injury.

If time permits, tie the casualty's wrists together across their chest before dragging.

To perform a drag carry:

1. Stand at the casualty's head facing their feet.
2. Crouch down and ease your hands under the casualty's shoulders. Grasp the clothing on each side. Support the casualty's head between your forearms to stop movement.
3. Drag the casualty backward only as far as necessary for their safety.

As an alternate method, the first aider and drag the casualty.

Because of the risk of aggravating any injuries, only use drag carries in the most extreme cases when there is an immediate threat to life.

Human crutch

If a leg or foot is injured, help the casualty to walk on their good leg while you give support to the injured side.

1. Take the weight of the casualty's injured side on your shoulders by placing the casualty's arm (on the injured side) around your neck and grasping the wrist firmly.
2. Reach around the casualty's back with your free hand, and grasp the clothing at the waist.
3. Tell the casualty to step off with you, each using the inside foot. This lets you, the rescuer; take the casualty's weight on the injured side.

Chair carry

The chair carry enables two rescuers to carry a conscious or unconscious casualty through narrow passages and up and down stairs. Do not use this carry for casualties with suspected neck or back injuries. Specially designed rescue chairs are available and should be used for this type of carry.

If the casualty is unconscious or helpless:

1. Place an unconscious casualty on a chair by sliding the back of the chair under their legs and buttocks, and along the lower back.
2. Strap their upper body and arms to the back of the chair.

3. Two rescuers carry the chair, one at the front and one at the back. The rescuer at the back crouches and grasps the back of the chair, while the rescuer at the front crouches between the casualty's knees and grasps the front chair legs near the floor.
4. The rescuers walk out-of-step.

Going down stairs

- The casualty faces forward
- The front rescuer faces the casualty
- A third person should act as a guide and support the front rescuer in case they lose their footing

Extremity carry

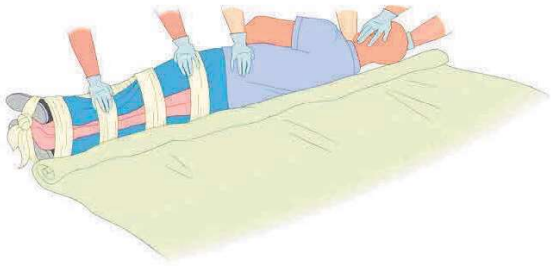
Use the extremity carry when you don't have a chair and do not suspect fractures of the trunk, head, or spine.

1. One rescuer passes their hands under the casualty's armpits, and grasps the casualty's wrists, crossing them over their chest.
2. The second rescuer crouches with their back between the casualty's knees and grasps each leg just above the knee.
3. The rescuers step off on opposite feet—walking out-of-step is smoother for the casualty.

Blanket lift with four bearers

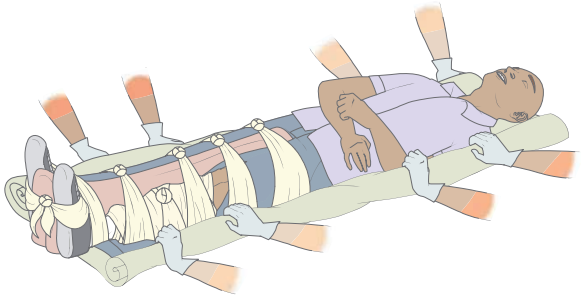
1. Roll the blanket or rug lengthwise for half its width. Position bearers at the head and feet to keep the head, neck and body in line. Place the rolled edge along the casualty's injured side.

2. Kneel at the casualty's shoulder and position another bearer at the waist to help log-roll the casualty onto the uninjured side. Turn the casualty as a unit so the casualty's body is not twisted.
3. Roll the casualty back over the blanket roll to lay face up on the blanket. Unroll the blanket and then roll the edges of the blanket to each side of the casualty. Get ready to lift the casualty—have the bearers grip the rolls at the head and shoulders, and at the hip and legs.



4. Keep the blanket tight as the casualty is lifted and placed on the stretcher.

Before using a blanket, test it to ensure that it will carry the casualty's weight. Do not use this lift if neck or back injuries are suspected.



Stretchers

There may be times when medical help cannot be contacted, or for other reasons, cannot come to the scene. When this happens, transport the casualty to medical help. If the casualty can't walk, or if the injury or illness allows only the gentlest movement, a stretcher should be used.

Principles for stretcher use

Complete all essential first aid and immobilization before moving the casualty onto a stretcher.

- Bring the blanketed and padded stretcher to the casualty, rather than moving the casualty to the stretcher.
- As the first aider in charge, take the position that permits you to watch and control the most sensitive area of the body, usually at the head and shoulders, or the injured part.

- Tell the bearers what each is expected to do. If the move is difficult, and time permits, it's a good idea to practice with a simulated casualty. This reduces risks and reassures the conscious casualty.
- Test an improvised stretcher with someone equal to or heavier than the casualty to ensure that it will hold.
- Check the clearance of an improvised stretcher to ensure that it will pass through hallways, doors and stairways without harm to the casualty. Use clear commands to ensure smooth, coordinated movements.

Commercial stretchers

The most common of the commercial stretchers is the rigid-pole, canvas stretcher. It has hinged bracing bars at right angles between the rigid poles at either end that must be locked in the extended position before the stretcher is used.

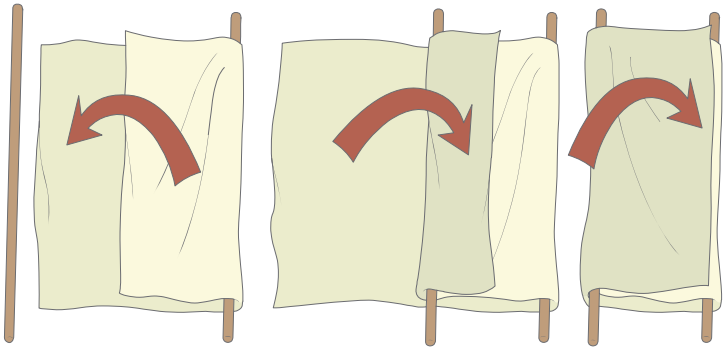
Improvised stretchers

If a commercially prepared stretcher is not available, you can improvise one by using two rigid poles and a blanket, clothing or grain sacks. Do not use non-rigid stretchers for casualties with suspected head or spinal injuries.

Improvised blanket stretcher

1. Place the blanket flat on the ground and place a pole one-third of the way from one end. Fold the one-third length of blanket over the pole.
2. Place the second pole parallel to the first so that it is on the doubled part of the blanket, about 15 cm (6 inches) from the doubled edge.

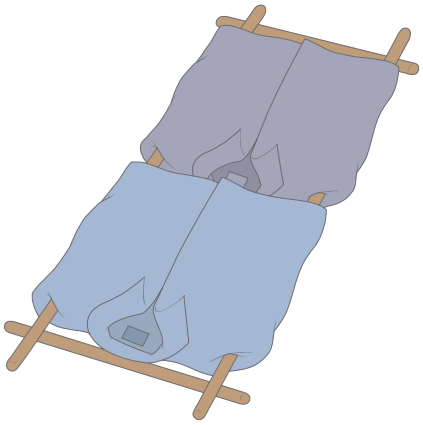
3. Fold the remaining blanket over the two poles. The casualty's weight on the blanket holds the folds in place.



Improvised jacket stretcher

A non-rigid stretcher can also be improvised from two jackets and two or four poles.

1. Button and zipper the jackets closed and pull the sleeves inside out so that the sleeves are inside. Lay the jackets on the ground so that the top edge of one jacket meets the bottom edge of the other.
2. Pass the poles through the sleeves of the two jackets on either side to complete the stretcher.



3. If the casualty is tall, prepare another jacket as before and add it to the stretcher with the head of the jacket towards the middle.

Four-bearer method—no blanket

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1. All bearers kneel on their left knees, three on one side of the casualty and one on the other, as shown below. Bearer 4 helps in lifting and lowering the casualty, and also places the stretcher under the casualty.
2. Bearer 4 joins hands with bearers 1 and 2. When assured that each bearer has a firm hold on the casualty, bearer 1 directs the others to "Get ready to lift" and then gives the command "Lift." Lift the casualty smoothly to the height of the raised knees.

3. On bearer 1's command "Rest," the casualty is gently laid on the raised knees of bearers 1, 2 and 3.
4. Bearer 1 tells bearer 4 to position the stretcher. Bearer 4 then resumes their position supporting the casualty by linking their hands with one from each of bearers 1 and 2. Position the stretcher.
5. When everyone is in position, bearer 1 instructs the team to, "Get ready to lower" and then, "lower." The team lowers the casualty gently onto the stretcher. Secure the casualty to the stretcher.

Three-bearer method, no blanket

The three-bearer method is essentially the same as the four-bearer method, except the first aider and one bearer share the weight on one side of the casualty. The third bearer links hands with the first aider from the opposite side to take up the weight of the trunk. The casualty is lifted and rested on the bearers' knees while the stretcher is positioned and bearer 3 links hands again with the first aider to help lower the casualty to the stretcher.

Carrying a stretcher

A stretcher should be carried by four bearers. As the first aider in charge, decide on the carrying method and give clear instructions to the bearers. After the casualty has been strapped to the stretcher, position yourself so you can watch the casualty and at the same time give direction to the other bearers.

Assign the remaining bearers (depending whether you are two or four) to respective corners or ends of the stretcher. Bearers crouch by the carrying handles of the stretcher, facing in the direction of travel.

- When the bearers have a firm footing and a good grip on the stretcher, give the command, "Get ready to lift," and then, "Lift."
- Ask the bearers if they are ready. When they are, give the command, "Go forward."
- When it is necessary to stop, give the commands "Stop," Get ready to lower," and then, "Lower."

To ensure the smoothest carry for the casualty:

- Four bearers carrying a stretcher step off together on the foot nearest the stretcher and keep in step
- Two bearers step off on opposite feet and walk out-of-step

Head-first carry

Although stretcher casualties are usually carried feet first, certain conditions call for a head-first carry:

- Leg injuries during a long downhill carry or when descending stairs, a head-first carry decreases pressure on the lower limbs and minimizes discomfort
- Uphill carries and going up stairs if there are no injuries to the legs—a head-first carry decreases blood flow to the casualty's head and is more comfortable
- Loading an ambulance or transferring the casualty to a bed—it is safer to do this head first, and easier to watch the casualty

Obstacles

When crossing uneven ground, a stretcher should be carried by four bearers and kept as level as possible. Bearers must adjust the height of the stretcher to compensate for dips and rises in the terrain.

Crossing a wall

Avoid crossing a wall, even if it means a longer carry. Where a wall must be crossed, follow these steps:

1. Lift the stretcher onto the wall so that the front handles are just over it. The rear bearers hold the stretcher level while the front bearers cross the wall. All lift together and the stretcher is moved forward until the rear handles rest on the wall.
2. The front bearers hold the stretcher level until the rear bearers have crossed the wall and resumed their positions at the rear of the stretcher.
3. The stretcher is then lowered to continue the journey.

Extrication

Extrication is the process of freeing casualties who are trapped or entangled in a vehicle or collapsed structure and cannot free themselves. Provide as much support as possible to the casualty during extrication. Whenever possible, give essential first aid and immobilize the injuries before the casualty is moved.

When there is an immediate danger and you are alone and must move a casualty from a vehicle, proceed as follows:

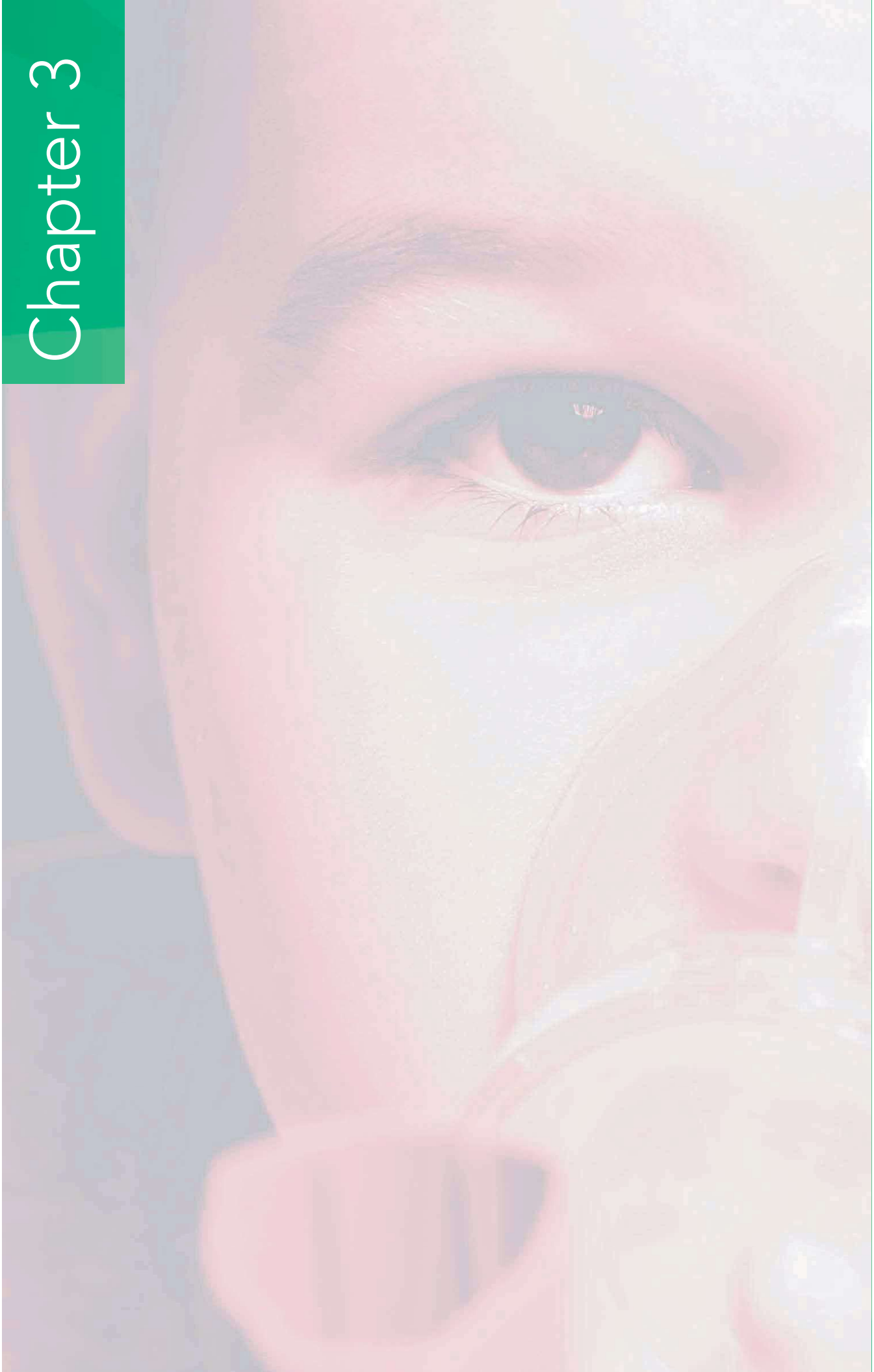
1. If necessary, disentangle the person's feet from the vehicle and bring the feet toward the exit. Ease your forearm under the person's armpit on the exit side, extending your hand to support the chin.

2. Ease the person's head gently backward to rest on your shoulder while keeping the neck as rigid as possible.

3. Ease your other forearm under the armpit on the opposite side and hold the wrist of the casualty's arm which is nearest the exit.

4. Establish a firm footing and swing around with the person, keeping as much rigidity in the neck as possible. Drag the casualty from the vehicle to a safe distance with as little twisting as possible.

Chapter 3



Airway and Breathing Emergencies

- Hypoxia
- Effective and ineffective breathing
- Inhalation injuries
- Breathing emergencies caused by illness
- Asthma
- Severe allergic reaction
- Choking

Chapter 3 Airway and breathing emergencies

When a person's breathing is affected through injury or illness, their life can be in immediate danger. As a first aider, you have to be able to recognize a breathing emergency very quickly and know what first aid to give—the casualty's life may depend on it.

3

Hypoxia

Choking and breathing emergencies cause a lack of oxygen in the blood, a condition called hypoxia. This can damage vital tissues and eventually cause death. The causes of hypoxia are grouped under three headings:

1. **Lack of oxygen** —for example:
    - The oxygen level is low, such as at a high altitude
    - The oxygen is displaced by other gases, such as a build-up of silo gas in a grain silo
    - The oxygen in a small space is used up—for instance in a confined space
2. **Blocked airway**—for example:
    - A casualty chokes on a foreign object, such as food
    - An unconscious casualty's airway is blocked by their tongue
    - A casualty's airway becomes swollen due to an allergic reaction
3. **Abnormal heart and lung function**—where the heart and lungs are not working properly due to:
    - An illness such as pneumonia or congestive heart failure
    - An injury preventing effective breathing
    - A drug overdose or poisoning

Effective and ineffective breathing

The normal breathing rate varies for infants, children and adults. A breathing rate that is too slow or too fast is a sign of a breathing emergency. Breathing rhythm refers to the interval between breaths. In normal breathing, the intervals are even and breathing is effortless—this is regular breathing. Breathing depth refers to the amount of air moved in and out of the lungs with each breath. Signs of **effective breathing** include:

- Breathing that is quiet
- Equal expansion of both sides of the chest when the person inhales
- The person is alert and relaxed
- Skin colour is normal
- Speaking without taking a breath every few words

When a person is not getting enough oxygen, the body responds by breathing faster and deeper. Signs of **ineffective breathing** include:

- The casualty is struggling for breath or gasping for air
- Breathing rate is too fast or too slow
- Breathing rhythm is irregular
- Breathing depth is too shallow or too deep
- Breathing is noisy or raspy
- The person is "getting tired" from trying to breathe
- The person is sweating
- Decreased level of consciousness
- The lips, ears and fingernail beds turn blue—called cyanosis
- Chest movement may be abnormal

First aid for ineffective breathing

Always send or go for medical help at the first sign of a breathing emergency.

The first aid for ineffective breathing has two parts:

1. Give first aid for the injury or condition and position the responsive casualty in the semi-sitting position if possible
2. If breathing stops the casualty will become unresponsive, get medical help immediately and begin CPR

This table lists some of the causes of breathing emergencies. To give first aid, first determine the cause of the breathing emergency, and then decide on the best first aid actions.

Causes of airway and breathing emergencies

Injuries	Medical conditions	Poisoning
Broken ribs	Asthma	Inhaled poison – e.g. carbon monoxide or hydrogen sulfide
Near drowning	Stroke	Swallowed poison – E.g. household cleaners or medication overdose
Knife or gunshot wound	Allergic reaction	Injected poison – e.g. bee sting
Burns to the face or airway	Pneumonia	
Head injury	Congestive heart failure	
Compression of the chest preventing chest expansion	Emphysema/bronchitis	

Inhalation injuries

Inhalation injuries happen when the casualty inhales hot steam or hot (superheated) air, smoke or poisonous chemicals.

Signs and symptoms of inhalation injuries include signs of shock:

- Dizziness, restlessness, confusion
- Pallor or cyanosis
- Abnormal breathing rate or depth

Together with a history of fire and:

- Noisy breathing
- Pain during breathing
- Burns on the face, especially the mouth and nose
- Singed hair on the face or head
- Sooty or smoky smell on breath
- Sore throat, hoarseness, barking cough, difficulty swallowing

First aid for an inhalation injury

1. Perform a scene survey and do a primary survey. Give first aid for the ABCs.
2. Place a conscious casualty in the semi-sitting position and loosen tight clothing at the neck, chest and waist.
3. If breathing stops, begin CPR starting with compressions.
4. Give ongoing casualty care until handover to medical help.

Breathing emergencies caused by illness

Illnesses that can lead to severe breathing difficulties include asthma, allergies, chronic obstructive pulmonary disease (e.g. emphysema), congestive heart failure, stroke and pneumonia.

Chronic Obstructive Pulmonary Disease (COPD)

Chronic Obstructive Pulmonary Disease is a term used to describe a group of respiratory conditions such as chronic bronchitis and emphysema. Casualties present with on-going shortness of breath and appear to be struggling to breathe. Some people may use supplemental oxygen delivered by nasal prongs from a small canister they carry when they have a more serious case of COPD.

Asthma

Asthma is a reactive airway illness in which the person has repeated shortness of breath, characterized by wheezing and coughing. A mild asthma attack is not a health emergency and can be managed by the casualty. A severe asthma attack can be fatal and requires immediate first aid. In response to a 'trigger' the person's airway can spasm, swell and secrete thick mucus, which narrows the airway passage.

Some common triggers that can cause asthma are:

- Colds, upper airway infections
- Pet dander
- Insect bites, stings
- Foods
- Pollen, paint and smoke

Signs and symptoms of a severe asthmatic attack:

- Shortness of breath with obvious trouble breathing
- Coughing or wheezing
- Fast, shallow breathing
- Casualty sitting upright trying to breathe
- Bluish colour in the face (cyanosis)
- Anxiety, tightness in the chest
- Fast pulse rate, shock
- Restlessness at first, and then fatigue

First aid for a severe asthma attack

1. Perform a scene survey and a primary survey; send for medical help.
2. Place the casualty in the most comfortable position for breathing. This is usually sitting upright with arms resting on a table.
3. Help the casualty take prescribed medication.
4. Give ongoing casualty care.
5. If the unconscious casualty stops breathing, begin CPR.

A person with asthma may carry medication in the form of a:

- Metered-dose inhaler (MDI)
- Turbuhaler
- Diskus®

Usually the person can give themselves this medication without help. If the person needs help, a first aider can assist.

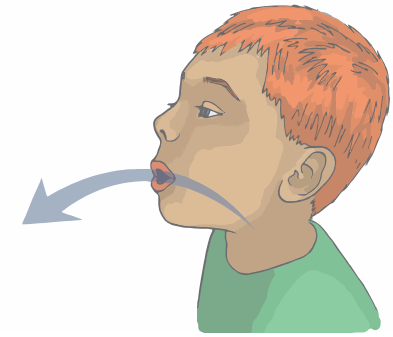
An inhaler delivers a pre-measured amount of medication. Always read and follow the manufacturer's instructions. Check the prescription label to confirm the casualty's name and expiry date.

To assist with a Metered Dose Inhaler

The metered dose inhaler (or "puffer") is the more common method of delivering medication for asthma.

Check your applicable workplace legislation/ regulations

1. Shake the container, then remove the cap.
2. Tell the casualty to breathe out completely,



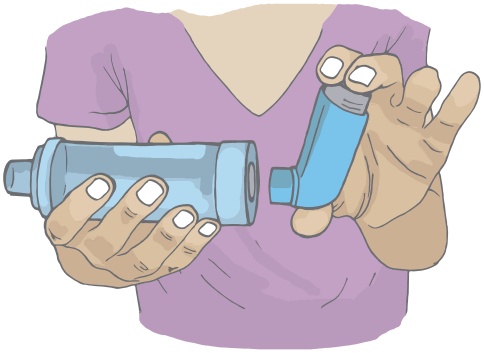
3. Tell the casualty to breathe in slowly and deeply—as the casualty does, the MDI will be pressed to release the medication. The MDI can be in the mouth, or just in front of the mouth.

4. Tell the casualty to hold their breath for 10 seconds so the medication can spread out in the lungs. Then tell them to breathe normally, so the medication won't be expelled. If more doses are needed, wait at least 30-60 seconds before repeating these steps.

3 Spacers (Aerochamber®)

When the medication comes out of the inhaler, it may be deposited on the back of the throat and not reach the lungs or the casualty may be gasping for air and unable to hold their breath. To deal with this, use a spacer if available. It traps the particles of the spray, allowing the casualty to inhale more effectively over several breaths.

Spacers make it simple to inhale the medication, and should always be used when available. Small children and other casualties who have difficulties coordinating proper inhalation with the release of the medication will often have spacers with them.



It allows them to inhale two or three times before the medication is completely dispelled. A mask can be attached to the device to make taking the medication easier.

If the casualty complains of throat irritation after using the inhaler, have them gargle or rinse the mouth with water.

Severe allergic reaction

An allergic reaction occurs when the immune system reacts to a substance the body encounters. Most allergies are annoying but not dangerous.

Anaphylaxis is a severe allergic reaction which usually happens when a substance to which the casualty is very sensitive enters the body, although it can also be caused by exercise or have no known cause. Anaphylaxis can happen within seconds, minutes or hours of a substance entering the body. As a rule, the sooner the casualty's body reacts, the worse the reaction will be. Anaphylaxis is a serious medical emergency that needs urgent medical attention.

Common early **signs and symptoms** of an allergy may include itchy flushed skin with hives; sneezing and a runny nose; coughing. If it's a severe reaction there may be swelling of the face and neck, especially the lips and tongue. Breathing may become difficult if the swelling is internal too. There may be nausea and vomiting and the casualty may be anxious and feeling sense of impending doom as their blood pressure drops and they go into shock. This is a true medical emergency and requires immediate first aid.

First aid for a severe allergic reaction

1. Perform a scene survey and a primary survey. Send for medical help.
2. Place the casualty in the most comfortable position for breathing—usually sitting upright.
3. Assist the casualty with their medication, usually this is an epinephrine auto-injector.
4. Give ongoing casualty care.

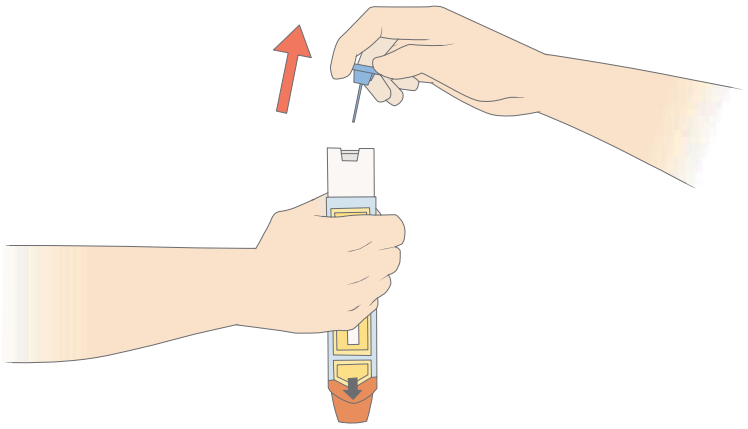
It is important to be familiar with, and follow the manufacturer's instructions, which is located on the side of the auto-injector.

Check the expiry date. If the only auto-injector is an expired product, it may still save a life and should be administered anyway, if the indicated liquid remains clear.

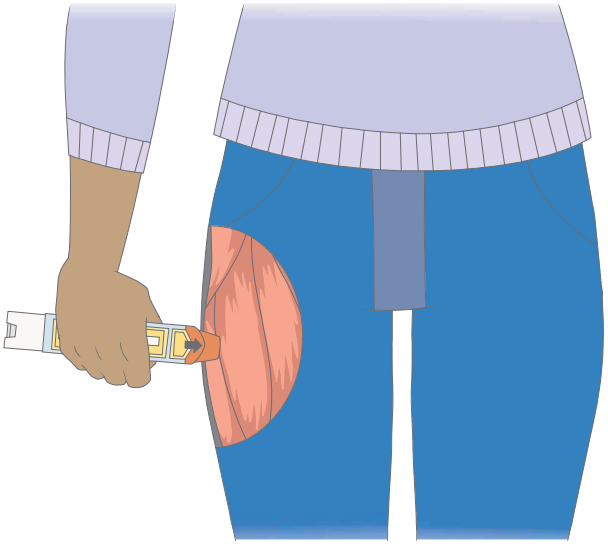
Check your applicable workplace legislation/ regulations

To use the auto-injector:

1. Remove the EpiPen® from the storage tube. Hold it firmly with the orange tip downward. Remove the blue safety release.



2. Use the auto-injector on only the fleshy part of the mid-outer thigh. Auto-injectors can be given through lightweight clothing.
3. Press the orange tip of the EpiPen® firmly into the mid-outer thigh until the unit activates.
4. Hold the auto-injector in place for several seconds, then pull it straight out.



5. After the injection, keep the casualty warm and avoid any exertion. Call 9-1-1 as soon as you have given the first dose.

If the casualty shows no improvement within 5 minutes or if their condition deteriorates before help arrives a second dose may be given if it is available. This will require a second EpiPen®. Individuals who are feeling faint or dizzy because of impending shock should be placed flat on their back unless they are vomiting or experiencing respiratory distress.

It is important that the casualty does not sit or stand immediately as this could cause a drop in blood pressure. The medication will begin to wear off within 10 to 20 minutes—get medical help right away.

If you or anyone else is injected by mistake, get medical help.

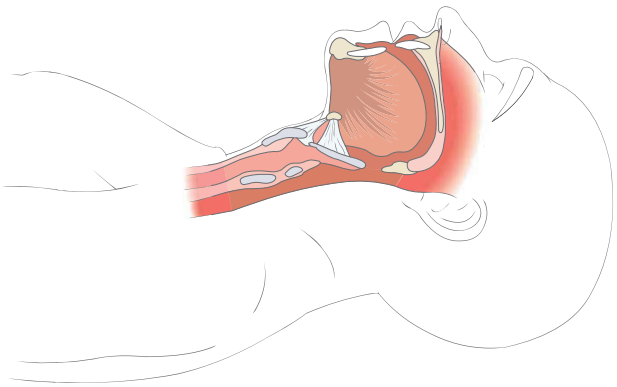
Follow manufacturer's directions for proper care of the used device. Put the used unit back in the storage container and take it to the hospital with the casualty.

Choking

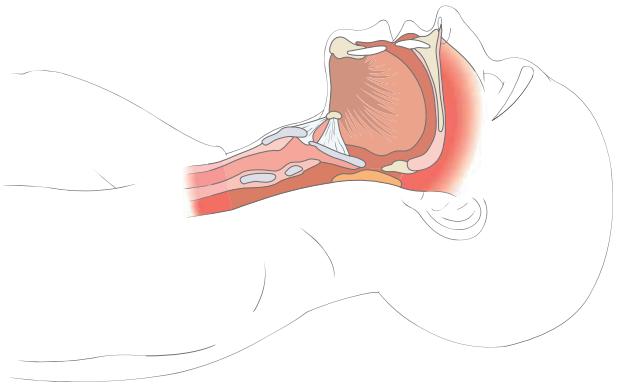
A person chokes when the airway is partly or completely blocked and airflow to the lungs is reduced or cut off. The choking casualty either has trouble breathing or cannot breathe at all.

3

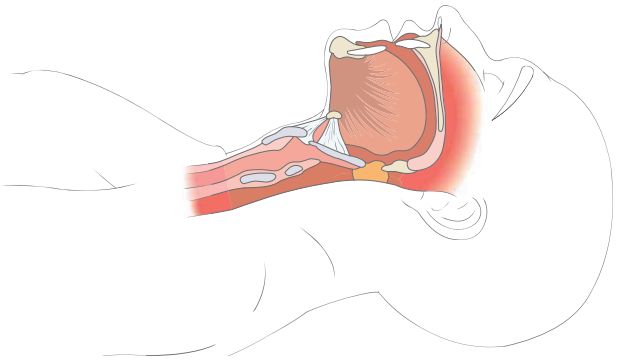
Open and clear airway



Partly blocked airway



Completely blocked airway



Causes of choking		
Foreign objects	**The tongue**	**Swelling**
Infants and children—food, toys, buttons, coins, etc.	Tongue falls to the back of the throat when lying on back	Injury to the throat area causes swelling of the airway
Adults—consuming drinks quickly with food in your mouth	Saliva, blood or vomit pools in the throat	Illness causes swelling, e.g. allergic reaction, asthma, epiglottis, croup
In elderly people—food, pills		Swollen airway

With good air exchange, the obstruction is mild and person can still cough forcefully, breathe and speak. With poor air exchange, the obstruction is severe and the person cannot cough forcefully, has trouble breathing, or cannot speak. With a completely blocked airway, there is no air exchange—coughing, breathing and speaking are impossible.

When the air supply to the lungs is cut off, the person's face immediately becomes red or "flushed". Shortly after, as the oxygen in the body is used up, the face becomes grey and the lips and ear lobes become blue. The person then becomes unconscious and eventually the heart stops beating.

Signs of choking	
Mild obstruction	**Severe obstruction**
Able to speak	Not able to speak
Signs of distress—eyes show fear	Signs of distress—eyes show fear
Forceful coughing	Weak or no coughing
Wheezing and gagging between coughs	High-pitched noise or no noise when trying to breathe
Red or "flushed" face	Grey face and blue lips and ears

First aid for choking

First aid for a choking adult or child

1. Perform a scene survey.
2. If the casualty can cough forcefully, speak or breathe, tell them to try to cough up the object. If a mild obstruction lasts for a few minutes, get medical help.

If you think there might be a severe obstruction, check by asking, "Are you choking?" If the casualty cannot cough forcefully, speak or breathe, use back blows followed by abdominal thrusts to remove the blockage.

1. Give back blows and abdominal thrusts:
2. Support the casualty and give up to five blows between the shoulder blades using the heel of your hand.
3. If the obstruction is not cleared, step behind the casualty ready to support them if they become unconscious.
4. Make a fist, place it on the casualty's abdomen at the belly button, in line with the hip bones. Grasp the fist with the other hand and give five

forceful inward and upward abdominal thrusts.

5. If the object is not removed, repeat back blows and abdominal thrusts.

If the casualty becomes unconscious

1. Lower them to the ground. Call for medical help and get an AED if available.
2. Begin chest compressions immediately. After the first 30 compressions, check the mouth. Remove any foreign object you can see. Try to give 2 breaths. If air does not go in, continue to give chest compressions and inspecting the mouth before ventilations.

First aid for a choking casualty much larger than the rescuer

If a choking casualty is very large or is in the late stages of pregnancy, give back blows as normal, followed by chest thrusts.

1. While supporting the casualty, give up to five back blows between the shoulder blades, using the heel of your hand.
2. If the obstruction is not cleared, stand behind the casualty.
3. Keep your arms horizontal and snug up under their armpits.

4. Place your fist against the lower half of the breastbone, thumb-side in.
5. Hold your fist with your other hand. Pull inward forcefully.
6. Continue giving back blows and chest thrusts until either the object is removed or the casualty becomes unconscious.

Choking adult – self-help

If you begin to choke on an object you may have to clear your own airway.

1. If there are people around, get their attention, do not isolate yourself from others.
2. Try to cough up the object.
3. Give yourself abdominal thrusts until you can cough forcefully, breathe or speak.

A second method is to use a solid object like the back of a chair, a table or the edge of a counter.

- Position yourself so the object is just above your hips.
- Press forcefully to produce an abdominal thrust.

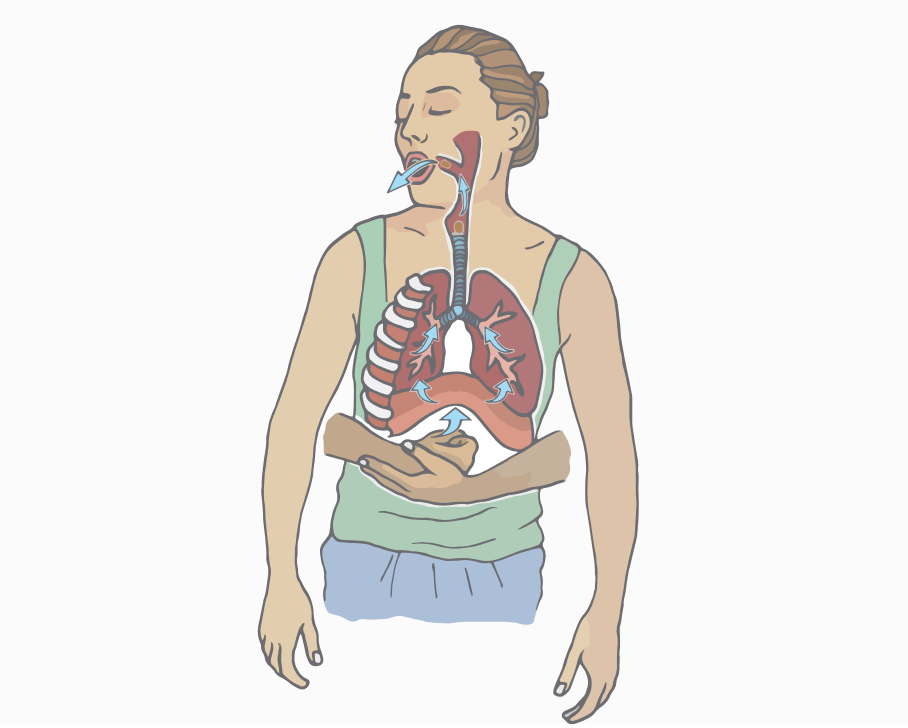
How abdominal thrusts work

When you choke on something, your body tries to unblock your airway by coughing.

Abdominal thrusts try to do the same thing with an artificial cough. The illustration below shows how an abdominal thrust creates a cough.

An abdominal thrust pushes the diaphragm up towards the lungs very quickly. This forces the air from the lungs up the airway and hopefully blows the obstruction out.

For the best effect, the fist has to be in the correct place. Keep your forearms off the abdomen and make each thrust a strong and sudden movement.



First aid for a choking casualty in a wheelchair

If you can reach around from behind the wheelchair, give back blows as normal, and abdominal or chest thrusts. If you cannot reach around the wheelchair:

- Position the wheelchair against a wall.
- Put the wheelchair brake on.

- If possible, carefully lean the casualty forward and support the shoulders. Perform five back blows between the shoulder blades, using the heel of your hand.
- Put the heel of one hand, with the other on top, in the middle of the abdomen and give up to five sudden, inward/upward thrusts.
- Alternatively, place the heel of one hand on the center of the breastbone and give firm chest thrusts.
- Repeat back blows and abdominal or chest thrusts until the object is removed or the casualty becomes unconscious.

If a doctor, physiotherapist or other health professional has shown you a different way of giving abdominal thrusts to a person in your care, use the recommended method.

If the casualty becomes unconscious, take them out of the wheelchair.

- Call for medical help and get an AED.

- Pull the casualty forward supporting them as best as you can and lower them to the ground.
- Roll the casualty to the floor to a face-up position.

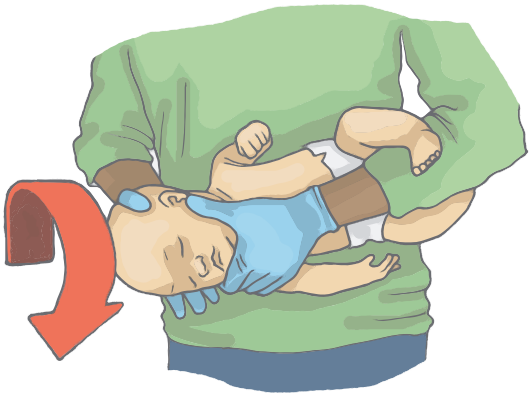
- Begin chest compressions immediately. After the first 30 compressions, check the mouth. Remove any foreign object you can see. Try to give 2 breaths and continue to give chest compressions and inspecting the mouth before ventilations.

First aid for a choking infant

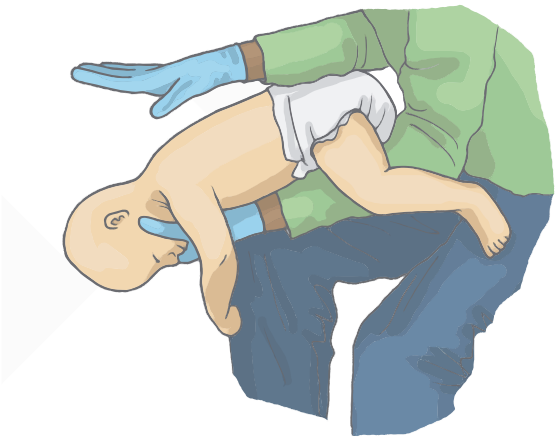
An infant is choking when they suddenly have trouble breathing, coughing, gagging, with high-pitched, noisy breathing.

1. Perform a scene survey and primary survey.
2. If the baby can cough forcefully or breathe let the baby try to cough up the object. If a mild obstruction lasts for more than a few minutes, send for medical help.

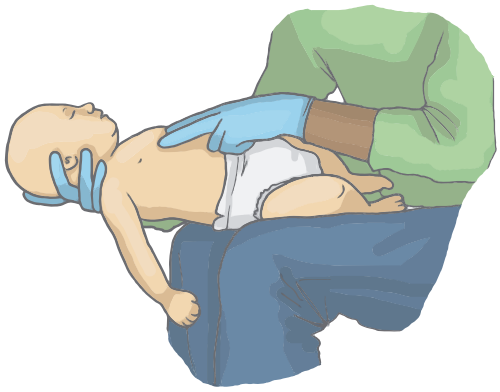
3. If the baby cannot cough forcefully, cannot breathe, makes a high-pitched noise when trying to breathe or starts to turn blue, begin back blows and chest thrusts.
4. Secure the baby between your forearms and turn them face down.



5. With the baby's head lower than the body, use the heel of your hand to give five forceful back blows between the shoulder blades.



6. Turn the baby face-up and give five chest thrusts.



7. Keep giving back blows and chest thrusts until either the airway is cleared or the baby becomes unconscious.
8. If the baby becomes unconscious, send for medical help. Begin chest compressions immediately.
   After the first 30 compressions, check the mouth. Remove any foreign object you can see. Try to give 2 breaths and continue to give chest compressions and inspecting the mouth before ventilations

Chapter 4

Cardiovascular Emergencies and Cardiopulmonary Resuscitation (CPR)

- Cardiovascular disease
- Chain of survival ®
- Angina and heart attack
- Stroke and transient ischemic attack (TIA)
- Cardiac arrest
- Cardiopulmonary resuscitation (CPR)
- Automated external defibrillation - (AED)

Chapter 4 Cardiovascular emergencies and Cardiopulmonary Resuscitation (CPR)

Cardiovascular disease

Cardiovascular disease is one of the leading causes of death of adults in Canada. Some of these deaths could be prevented if appropriate first aid was given. This chapter describes the first aid for cardiovascular emergencies, including

- First aid for angina/heart attack
- First aid for stroke/TIA
- First aid for cardiac arrest, which is CPR

High blood pressure

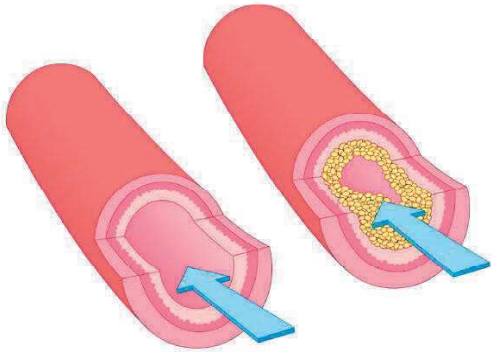
Blood pressure is the pressure of the blood against the inside walls of the blood vessels. Blood pressure goes up and down naturally. When a person is excited or emotionally stressed, blood pressure goes up, but it usually comes down once the excitement has passed. In some people, their blood pressure stays high all the time. This condition of constant high blood pressure is called hypertension.

Over time, hypertension damages the tissues of the cardiovascular system. The walls of the blood vessels become thick and lose their elasticity and the heart becomes enlarged. The changes caused by high blood pressure increase the risk of stroke, heart attack, kidney, and eye problems. Unfortunately, hypertension does not always give warning signals—you may feel perfectly well but still have high blood pressure. This is why it is often called the "silent killer."

If you have concerns about your blood pressure, you should speak with your primary health-care provider. Blood pressure machines located in pharmacies can help you monitor your blood pressure, but should never be used as a means of self-diagnosis.

Narrowing of the arteries

Arteries are the blood vessels that carry blood away from the heart. They become diseased when fatty deposits build up inside them, making the passage for blood narrower. This process of depositing fat and narrowing of the arteries is called atherosclerosis. In the coronary arteries, which carry oxygenated blood to the heart, it is called coronary artery disease.



As an artery gets narrower, less and less blood can get through. When the artery gets too narrow, the tissues on the other side of the narrowing don't get enough oxygenated blood to function normally. Although the signs and symptoms of hardening of the arteries usually don't appear until middle age or later, atherosclerosis often begins in childhood.

Angina

Angina occurs when the blood supply feeding the heart muscle becomes limited due to narrowed, damaged, or blocked arteries. When the heart works harder and needs more blood (e.g. when you run for a bus or shovel snow), it cannot get enough blood. This causes pain or discomfort in the chest, which may spread to the neck, jaw, shoulders, and arms. Angina pain typically doesn't last long, and goes away if the person rests and takes their prescribed medication.

Heart attack

A heart attack happens when heart muscle tissue dies because its supply of blood has been cut off. A heart attack can feel just like angina, except the pain doesn't go away with rest and medication. If the heart attack damages the heart's electrical system, or if a lot of the heart muscle is affected, the heart may stop beating properly. This is cardiac arrest.

4

Risk Factors

A number of factors increase the risks for cardiovascular disease, heart attack, and stroke. These can be broken down into modifiable and non-modifiable risks.

The modifiable risk factors can lead to dyslipidemia (increased deposits of fats), obesity, diabetes, and high blood pressure.

Non-modifiable	Modifiable
• Age • Genetic History • Sex	• Smoking • Poor diet • Lack of exercise • Increased stress

Modifiable risks can be reduced through lifestyle changes.

Angina and heart attack

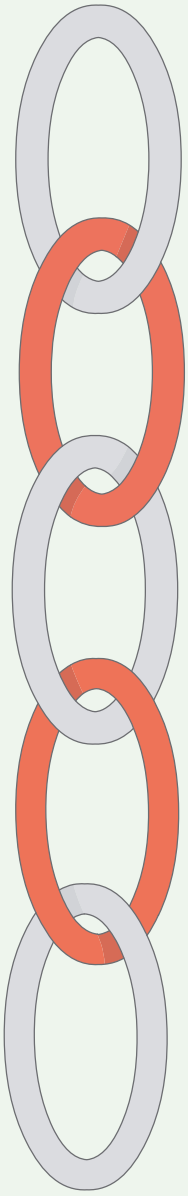
Early recognition and denial

The first step is recognizing a cardiovascular emergency. It's difficult to accept that someone is having a heart attack and could die very soon, especially if the person is a family member or a close friend. The casualty is often denying anything serious is happening as well, so it's easy to accept their reassurances.

On average, casualties take several hours to get to a hospital from the time they first start feeling poorly. It is this wasted time that prevents many lives from being saved. When someone complains of chest pain, shortness of breath and looks odd you should consider it a serious problem—that's early recognition, and call for medical help. Getting the casualty to the hospital quickly gives them the best chance for survival.

Chain of Survival®

CPR is often what comes to mind when people think of first aid for a heart attack or cardiac arrest. But CPR is only part of the picture. There are five steps that are important when helping someone with heart problems.



1. Immediate **recognition** of a cardiovascular emergency and activation of the community emergency medical services (EMS) system. This means calling for help quickly.
2. Early **CPR** with an emphasis on chest compressions.
3. Rapid **defibrillation**.
4. Effective **advanced life support**.
5. Integrated **post-cardiac arrest care**.

Each of the steps is as important as the others. Time is a vital ingredient. To give a casualty in cardiac arrest a reasonable chance of survival, CPR must be started immediately followed by defibrillation as quickly as possible. For both procedures, the sooner they happen, the better.

You, the first trained person on the scene, are responsible for initiating the sequence. You must recognize the cardiovascular emergency, call for medical help, start CPR if needed, and apply a defibrillator if one is available. You are the crucial first three links in the Chain of Survival®.

If nothing is wrong the ambulance crew can reassure the casualty. On the other hand, if there is a serious problem, you may have saved a life.

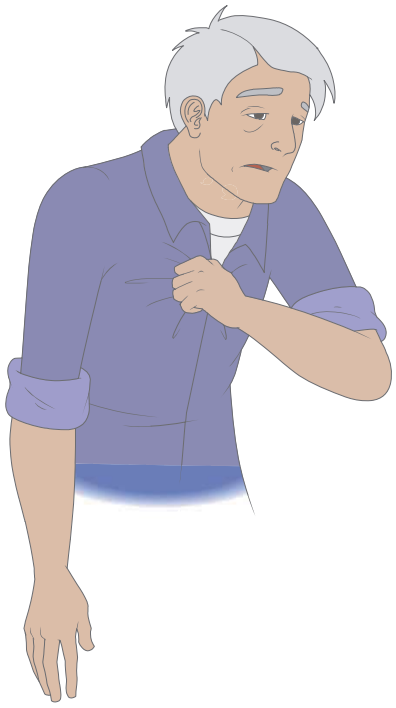
Signs and symptoms of angina and a heart attack:

A heart attack will produce shock and may display some or all of the following:

- Pale, ashen skin
- Sweating, cold and clammy to the touch
- Shortness of breath
- Showing obvious pain or discomfort

The pain or discomfort will be in the upper body, from the upper abdomen to the jaw and arms, and may feel like:

- Heaviness in chest
- Tightness or pressure in chest
- Squeezing or crushing chest
- Indigestion, nausea or vomiting
- Aching jaw
- Sore shoulder or arms



Some other **signs and symptoms** include:

- Fatigue
- Anxiety, which produces denial
- Central back pain

Denial is an important detail. If someone showing signs of shock, having trouble breathing and experiencing pain insists there is nothing wrong, then you should be very suspicious and take action.

First aid for angina/heart attack

1. Perform a scene survey, then do a primary survey. Ask the casualty questions :
   - "Can you show me where it hurts?"
   - "Have you had this pain before?"
   - "Do you have medication for this pain?"
2. Call for medical help and get a defibrillator.
3. Place the casualty at rest, the semi-sitting position is usually the best option, and reassure them.
4. Assist the conscious casualty to take their prescribed medication, usually nitroglycerin. If the casualty has no prescribed medication, or the first dose is ineffective, ask the casualty if they have any allergies to ASA, or if a doctor has ever told them not to take it. If the casualty believes they can take it, suggest they chew one regular ASA tablet (or two low-dose tablets). ASA can reduce the effects of a heart attack because of its anti-clotting properties.
5. If the casualty loses consciousness and stops breathing, start CPR.

Helping with Nitroglycerin

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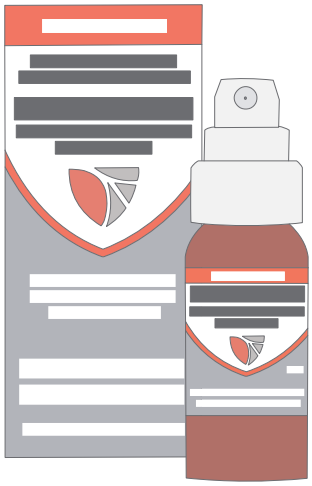


Nitroglycerin tablets or sprays are common medications for relief of chronic angina pain. A casualty in serious distress may need your help to take their medication.

Ask the casualty if they have taken any other medications today. Drugs to treat erectile dysfunction such as Viagra® or CIALIS® may cause a significant decrease in the person's blood pressure if nitroglycerin is taken as well.

Have the casualty spray the medication under the tongue or place the tablets under the tongue—they aren't to be swallowed.

Nitroglycerin may be repeated, if needed, every 5-10 minutes to relieve pain, or until a maximum of three doses have been taken. Remember that if you have to assist someone to take their medication, you must call for medical help!

Stroke and transient ischemic attack (TIA)

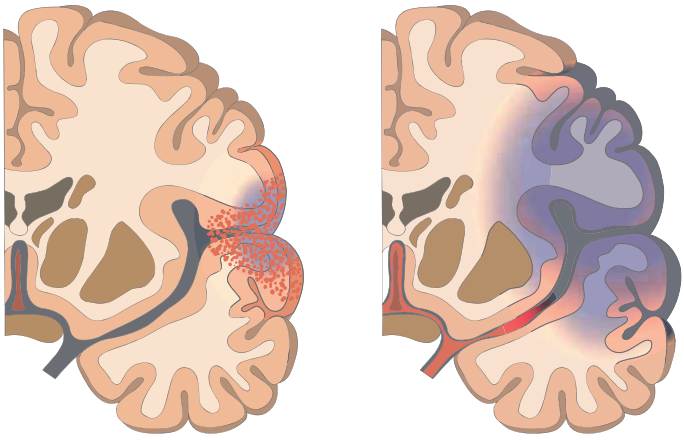
Stroke

A stroke happens when blood flow to a part of the brain is interrupted either by a blocked artery or by a ruptured blood vessel in the brain. A stroke may cause brain damage which impairs certain body functions, depending on the part of the brain affected.

Transient ischemic attack (TIA)

A TIA is a temporary blockage of the blood flow to part of the brain. It's typically of short duration and leaves no permanent damage but looks exactly like a stroke.

Doctors now have therapies to restore blood flow to the heart muscle and brain, but they work best if used right away. This is why it's important to realize there's an emergency and call 9-1-1 to get the casualty to the hospital right away—the longer medical help is delayed, the more likely the heart or the brain will be damaged.



Remember **FAST** as a way to check for the **signs and symptoms** of a stroke and to get immediate help.

- **Facial droop**. Ask them to smile. One side of the face may not move as well as the other side.
- **Arm drift**. Ask the casualty to hold both arms out with the palms up, and close their eyes. One arm may not move or drifts down compared to the other arm.
- **Speech**. Ask them to repeat a phrase you say. The casualty may slur words, use the incorrect words or is not able to speak.
- **Time**. When was the onset of symptoms? Ask the casualty, or their family, friends, or bystanders when the symptoms were first noticed. Get immediate medical help; the earlier a stroke is treated the better the outcome.

Other signs and symptoms of a stroke include

- Blurred vision
- Sudden confusion
- Dizziness
- Headache
- Loss of balance.

It is important that first aid providers do not dismiss the signs and symptoms of a stroke as intoxication.

First aid for stroke/TIA

1. Perform a scene survey, then do a primary survey; perform the FAST assessment.
2. Call for medical help.
3. Place the casualty at rest in the semi-sitting position.
4. Give nothing by mouth, especially ASA.
5. Give ongoing care.

If the casualty becomes unconscious, place them in the recovery position. If there is paralysis, position the casualty with the paralyzed side up. This will reduce the chance of tissue or nerve damage to the affected side.

Cardiac arrest

Cardiac arrest means the heart stops beating properly. With no blood flow going to the brain the casualty becomes unresponsive and stops breathing. Cardiac arrest means the casualty is clinically dead, but if CPR is started and a defibrillator is applied quickly there is still an opportunity to restore a normal heartbeat.

Common causes of cardiac arrest include:

- Heart attack
- Severe injuries
- Electrical shock
- Drug overdose
- Drowning
- Suffocation

Cardiopulmonary Resuscitation (CPR)

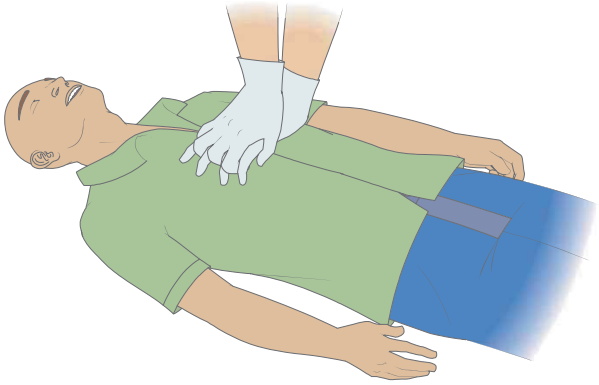
CPR is artificial respiration and artificial circulation. Artificial respiration provides oxygen to the lungs. Artificial circulation causes blood to flow through the body. The purpose of CPR is to circulate enough oxygenated blood to the brain and other organs to delay damage until either the heart starts beating again, or medical help takes over from you. CPR is most effective when interruptions to chest compressions are minimized.

CPR – Adult casualty

1. Perform a scene survey.
2. Assess responsiveness.
3. If there is no response, call for medical help on a mobile device, and place the phone on speaker-phone, and send someone for an AED. If no mobile phone is available, send or go for medical help and the AED, if available.

4. Perform a primary survey:
   - Open the airway.
   - Check for breathing for at least 5 and no more than 10 seconds.
5. If the casualty is not breathing, or not breathing effectively

(agonal breaths) position your hands in the centre of the upper chest and your shoulders directly over your hands. Keep your elbows locked.



6. Give 30 compressions—Push hard—Push Fast!
   - Press the heels of the hands straight down on the breastbone. The depth of each compression should be at 5-6 cm (2-2.4 inches).
   - Release pressure and completely remove your weight at the top of each compression to allow chest to return to the resting position.
   - Give compressions at a rate of 100 to 120 per minute. Count compressions out loud to keep track of how many you have given, and to help keep a steady rhythm.

7. Open the airway by tilting the head and lifting the chin.
8. Position a barrier device and breathe into the casualty twice. For an adult casualty, each breath should take about for 1 second, with just enough air to make the chest rise.

This is one cycle of 30:2 (30 compressions to 2 ventilations).

9. Continue CPR until either an AED is applied, the casualty begins to respond, another first aider or medical help takes over or you are too exhausted to continue. The AED should be applied as soon as it arrives at the scene.

Agonal breathing

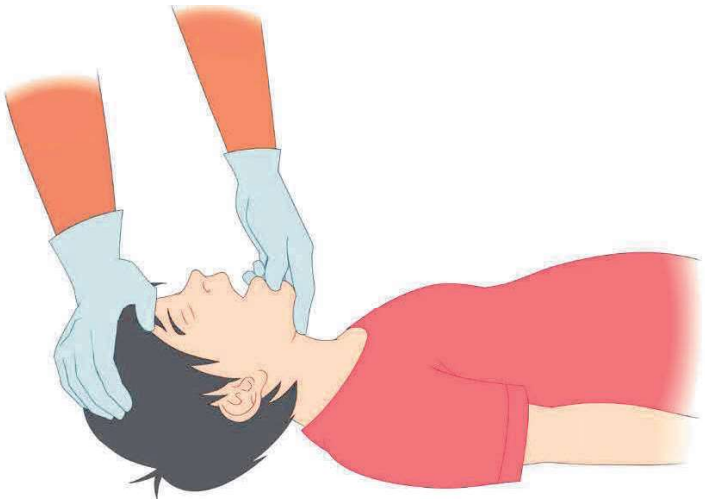
Agonal breathing is an abnormal pattern of breathing driven by a brain-stem reflex, characterized by irregular gasping respirations at times accompanied by strange vocalizations. They can occur with cardiac arrest and lead bystanders to believe the casualty is breathing. A casualty with agonal breathing should be treated as though they are not breathing.

CPR – Child casualty

1. Perform a scene survey.
2. Assess responsiveness.
3. If there is no response, send or call for medical help and an AED if available.

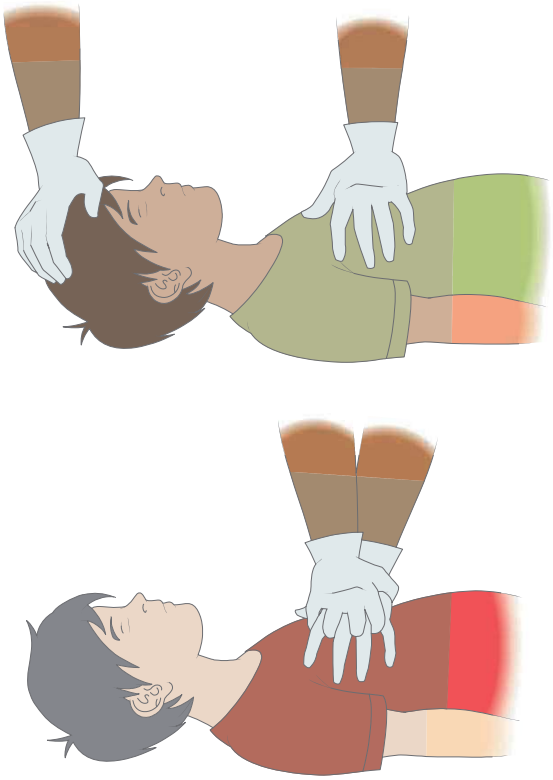
If you are alone with no phone perform 5 cycles of CPR (two minutes) then go for medical help. Carry the child with you if possible.

4. Perform a primary survey:
   - Open the airway.
   - Check for breathing for at least 5 and no more than 10 seconds.



5. If the casualty is not breathing, or not breathing effectively (agonal breaths) position your hands in the centre of the upper chest and your shoulders directly over your hands. Keep your elbows locked. You may use one or two hands depending on the size of the child.

6. Give 30 compressions—Push hard—Push Fast!



- Press the heels of the hands straight down on the breastbone. The depth of each compression should be 1/3 of the chest depth, or 5 cm (2 inches).
- Release pressure and completely remove your weight at the top of each compression to allow chest to return to the resting position.
- Give compressions at a rate of 100 to 120 per minute. Count compressions out loud to keep track of how many you have given, and to help keep a steady rhythm.

7. Open the airway by tilting the head and lifting the chin.
8. Position a barrier device and breathe into the casualty twice, with just enough air to make the chest rise.

This is one cycle of 30:2 (30 compressions to 2 ventilations).

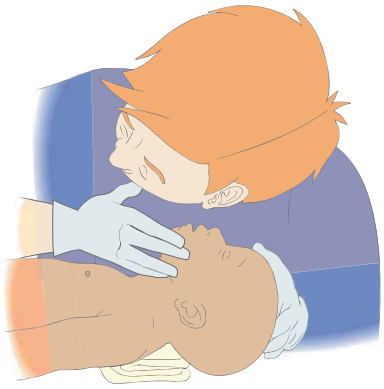
9. Continue CPR until either an AED is applied, the casualty begins to respond, another first aider or medical help takes over or you are too exhausted to continue. The AED should be applied as soon as it arrives to the scene.

CPR – Infant casualty

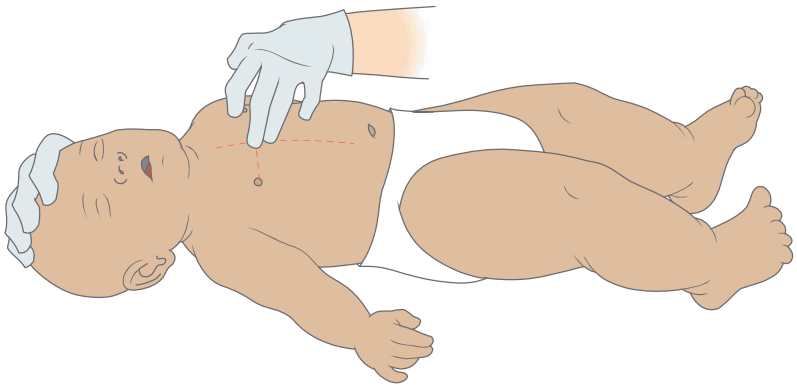
1. Perform a scene survey.
2. Assess responsiveness. Gently tap the baby's feet.
3. If there is no response, send or call for medical help and an AED if available.

If you are alone with no phone perform 5 cycles of CPR (two minutes) then go for medical help. Carry the infant with you if possible.

4. Perform a Primary Survey
   - Open the airway.
   - Check for breathing for at least 5 and no more 10 seconds.



5. If the baby is not breathing, or not breathing effectively (agonal breaths) begin CPR



- Place two fingers on the breastbone just below the nipple line. Push down on the breastbone 1/3 the depth of the chest or about 4 cm (1 1/2 inches).

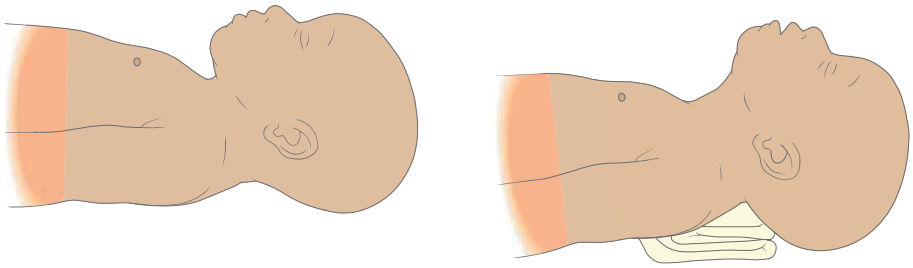
- Release the pressure completely but keep your fingers in light contact with the chest. Repeat the pressure and release phases rhythmically so that each phase takes the same amount of time.
- Give compressions at a rate of 100 to 120 per minute. Count compressions out loud to keep track of how many you have given, and to help keep a steady rhythm.

6. Open the airway by tilting the head and lifting the chin.
7. Position a barrier device and breathe into the casualty twice, with just enough air to make the chest rise.

This is one cycle of 30:2 (30 compressions to 2 ventilations).

8. Continue CPR until either an AED is applied, the casualty begins to respond, another first aider or medical help takes over or you are too exhausted to continue. The AED should be applied as soon as it arrives to the scene.

The back of an infant's head is quite large compared to the rest of the body. This causes the baby's head to come forward and close off their airway.



An infant's head flexes forward when they are lying on their back.

When giving CPR, it may be helpful to put a thin pad under the shoulders to help keep the airway open—but don't waste time looking for a pad.

Chest compression only CPR

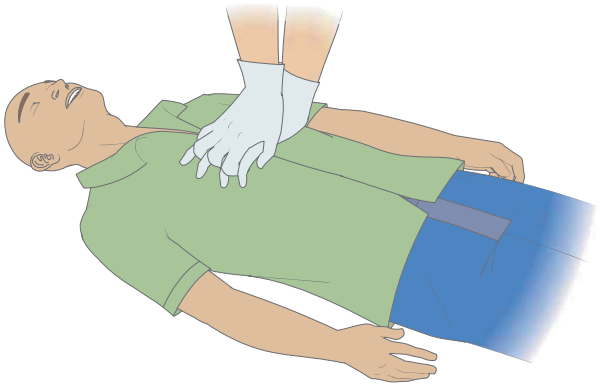
CPR guidelines stress early recognition of the emergency and stress the importance of calling 9-1-1 or the local emergency number if you find someone collapsed and unresponsive.

If you have not been trained in CPR or are hesitant to perform ventilations, for any reason—don't give up. Your actions can still save a life.

4

Compression only CPR is CPR without mouth-to-mouth breaths. Provide high quality chest compressions by pushing hard and fast on the centre of the chest, at a rate of 100 to 120 compressions per minute.

Although this does not give the casualty any oxygen, this option can be used by people not trained in conventional CPR, or those who are unsure of their ability.



Dispatcher-assisted CPR

In many locales, the 9-1-1 dispatcher is trained to coach you through an emergency until medical help arrives. Put your phone on speaker and place it by the casualty's head and talk to the dispatcher throughout the rescue.

How to take over CPR from another rescuer

1. Offer to help, tell the rescuer that you are trained in CPR. Ensure medical help has been called.

2. Give 30 compressions followed by 2 breaths. Use your own barrier device if available

Two-rescuer CPR

If two trained rescuers are available, they can cooperate to perform CPR on a casualty. There are three advantages to two rescuers performing CPR as a team:

- CPR is a strenuous physical activity and as a first aider gets tired the quality of the chest compressions will deteriorate. By sharing the task of compressing the chest two rescuer CPR allows for a team to perform effective chest compressions for a longer period of time.
- Two-rescuer CPR minimizes the time the compressions are interrupted for ventilations to be given.
- Two-rescuer CPR allows the rescuers to give feedback and support each other during a stressful event.

To perform two-rescuer CPR the first aider who performs the primary survey stays at the casualty's head, keeping the airway open and ventilating after 30 compressions. The second rescuer will compress the chest, but in order to maintain the most effective compressions, it is recommended that rescuers switch after every 5 cycles of compressions and ventilations (approximately 2 minutes).

Automated External Defibrillation—AED

Automated external defibrillation, the application of an electric shock to a heart that has stopped pumping effectively, has been proven to be one of the most important tools in saving the lives of sudden cardiac arrest casualties. It is the third link in the Chain of Survival® and is the responsibility of the first aider.

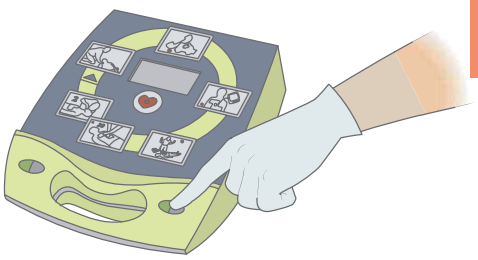
An automated external defibrillator (AED) is an electronic device that is programmed to recognize and shock two types of heart rhythms, Ventricular Fibrillation (VF) and pulseless Ventricular Tachycardia (VT). If the machine recognizes either VT or VF in a casualty, it will charge and will indicate that a shock is advised. The purpose of this shock is to correct the abnormal electrical disturbance and re-establish the heart rhythm.

It is important to remember that AEDs will only shock when VT or VF is present. You cannot shock a heart that is in normal rhythm, nor will the machine shock when it is not appropriate, such as when the heart is stopping (asystole) or there is pulseless electrical activity (PEA)

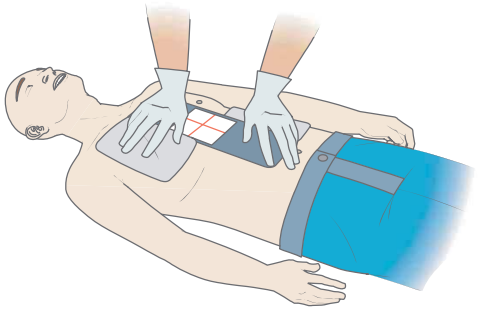
Time is a critical factor in determining survival from cardiac arrest; the heart will only stay in fibrillation a short time before all electrical activity ceases. Defibrillation must be performed early to be most effective. CPR can keep oxygenated blood flowing to the brain, and helps extend the length of time that the heart will remain in VT or VF, the only arrhythmias that AEDs will shock. CPR then can "buy some time" for the casualty until the AED is attached and ready to deliver a shock.

Using an AED (always follow the AED's voice prompts)

1. Power on the AED.

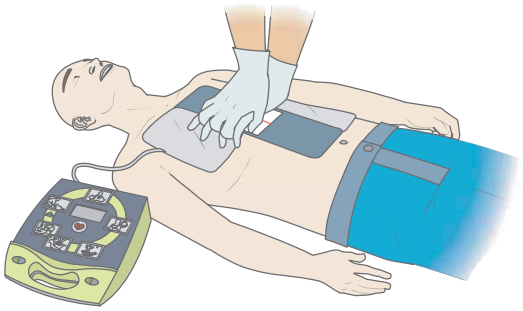


2. Follow the voice prompts. The audio instructions will direct you to:
    - Bare the chest and attach electrode pads. The pads need to stick directly to the skin, so excessive sweat, water, and chest hair needs to be removed before application



    - Stand back (or clear)
    - Press the shock button and/or continue CPR as prompted by the machine

Continue with CPR and listen for the AED to give additional instructions



Defibrillation—Special Considerations and Special Circumstances

Pregnant patients–AEDs can be used in all stages of pregnancy.

Pacemakers or implanted defibrillators–Defibrillator pads should not be placed directly over a pacemaker site but should be approximately 2.5 cm (one inch) away. Look for scars or lumps on the chest as an indicator of implanted devices.

Children under 8 years of age–Automated external defibrillators (AEDs) may be used for children and infants. Special pads or a pediatric setting on the machine are used, but if not available adult pads can be used. Some adult pads show an alternate placement for children/infants.

Patch medications–some casualties wear a patch that contains medication such as nitroglycerin for angina. If the patch is in the way of the pad placement, gently remove it with gloved hands from the chest and wipe the area clean.

Wet environment–AEDs can be used in wet areas. Dry the chest to ensure good pad contact. Move the casualty to a dry area if possible. If you or the casualty is submersed in water, avoid using the AED.

Metal surfaces–AEDs can be used safely with the casualty on a metal surface.

Jewelry and piercings–Avoid placing pads over-top of piercings, jewelry, or anything that would cause a gap. AED pads should adhere flat to the skin.

Environment–Ensure the environment you are using an AED in does not contain explosive gases.

Post-resuscitation care and handover to EMS

If defibrillation is successful, the casualty may start breathing on their own but remain unresponsive. In this case, place the casualty into the recovery position and monitor the ABCs. Leave the AED attached. The AED will continually monitor the heart rhythm or you may need to use the device again.

Certain information is important for emergency services personnel such as the time of collapse, time when CPR was started, time when first shock was delivered and number of shocks. Provide as much detail as possible and follow the directions of medical personnel once they arrive on the scene.

Regulations concerning the requirement of a workplace to have an AED, and the necessary policies about AEDs, will be contained within federal, provincial, or territorial legislation. Where not specifically outlined by regulations, a workplace should have an established AED policy which outlines:

- Certification and recertification requirements
- Maintenance and inspection processes
- Post-use process (downloading information, resupplying pads and rescue pouch, etc.)
- Replacement of batteries and pads
- Replacement of unit at its end-of-life

Troubleshooting and maintenance

Sometimes the device will indicate "Check Electrodes". If this occurs, check the cable to pads connection, the cable to machine connection and the adherence of the pads to the casualty's chest.

Machines will also advise if motion is detected or if the battery is low. AEDs are sold with an instruction manual that will outline troubleshooting in detail.

Regular maintenance of AED units, including regular inspections, are important to ensuring the AED is available when it is needed. Most AEDs perform a daily system check and display in some manner it is ready for use. A monthly check of the unit is recommended to ensure the pads are still good (they have an expiry date), the rescue pack is present and stocked, and the status is green. Always follow manufacturer suggested guidelines and checklists.

Chapter 5