PRIORITY
FIRST AID
TRAINING & EVENT COVERAGE
Push Hard, Push Fast

FIRST AID Program Training Manual

Preface

Introduction to the First Edition of Priority First Aid's First Aid Manual

Welcome to the first edition of Priority First Aid's First Aid Manual. Our team, with years of experience in teaching, developing, and managing first aid programs, is thrilled to present the first Canadian First Aid manual specifically designed to meet the requirements of CSA Standard Z1210-17.

The field of first aid has evolved significantly in recent years, and this manual reflects those changes. With advancements like dispatcher-assisted first aid, the widespread availability of Automated External Defibrillators (AEDs), and the introduction of life-saving medications for managing heart attacks, hypoglycemia, and opioid overdoses, the way we approach emergency care has been revolutionized.

Canadians today have greater access to information on how to manage chronic conditions and recognize the signs of acute medical emergencies, such as stroke or heart attack. Despite this increased awareness, many still feel unprepared to respond effectively in a crisis.

At Priority First Aid, we frequently hear from our students that they value courses that focus on simple, practical skills, are free of unnecessary technical jargon, and provide clear, actionable steps for assisting others in emergency situations. This manual aims to meet those needs by offering straightforward guidance that empowers individuals to take quick, confident action when faced with medical emergencies.

We are excited to guide you through this manual, and we hope it equips you with the knowledge and skills to make a real difference in an emergency.

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Principles of Workplace First Aid

It's a real life situation:

The goal of workplace first aid training is to help eliminate injuries in the Canadian workplace and to teach workers to provide effective first aid to workers when required.

In 2022,Canadian workers sustained 18,131 disabling injuries in federally regulated industries alone.

In New Brunswick the most common injuries suffered by workers included back, and spine, spinal cord, shoulder, multiple body parts including leg(s), finger(s), ear(s).

Learning Objectives

- Understand the role and responsibilities of a first aider
- Understand the correct methods for the administration of medication
- Know the contents of workplace first aid kits and how to use equipment.
- Know the principles of effective communication
- Understand how to use PPE and dispose of Sharps
- Understand OHS

CSA Standards

L.1 Principles of workplace first aid
L.1.1 The role and responsibilities of a first aider
L.1.2 Administration of medication
L.1.3 Workplace First aid kit and equipment
L.1.4 Principles of effective communication
L.1.5 Workplace first aider safety and personal protection
L.1.6 Occupational Health and Safety

Role and Responsibilities of a First Aider

First Aid is the immediate care given to someone who is injured or suddenly falls ill. The goal is to preserve life, prevent the condition from worsening, and promote recovery until medical care arrives.

A Workplace First Aider is someone who has basic knowledge of first aid techniques and procedures to care for a casualty's condition until professional medical help arrives.

Adult: A person past puberty
Child: A person between 1 year and puberty
Infant: A person below 1 year

3 Goals of First Aid
The "3 P's":

Preserve Life

Prevent Further injury

Promote recovery

Certification for first aiders comes in three levels: **basic**, **intermediate**, and **advanced**.

CSA standard key:

Awareness (A): The workplace first aid aider will have information and will be able to access other resources about this topic.

Knowledge (K): The workplace first aider will be able to recognize and recall knowledge related to this topic.

Skill (S): The workplace first aider will be able to apply a procedure or protocol, at the required competency level.

Legislation relevant to first aid

When to start

Identify yourself as the first aider to the casualty

- A first aider requires consent to assist a conscious casualty. If the casualty is or becomes unconscious, consent is implied.
- If the casualty refuses your first aid and you are concerned for their well-being call 911.
- Act reasonably and help the casualty to the best of your ability.

When to stop

Once you begin first aid, you should continue until:

- Another qualified person takes over.
- You become too exhausted to continue.
- You are at risk yourself
- EMS or another trained individual assumes responsibility.

Good Samaritan Principles

A legal principle that prevents a rescuer who has voluntarily helped a casualty from being sued for "wrongdoing", as long as they act in a reasonable manner for their skill level.

Legislation

Occupational Health and Safety Legislation (OHS) in Canada outlines the general rights and responsibilities of the employer, the supervisor and the worker through an act or statute and related regulations. In Canada, there are fourteen (14) occupational health and safety legislation jurisdictions:

- 1 Federal
- 10 Provincial
- 3 Territorial

Each of these jurisdictions has its own OHS legislation, which states the minimum legal requirements for workplace first aid, including but not limited to the type of first aid equipment and training required. Additionally, each jurisdiction will have specific requirements for reporting injuries.

Federal Legislation

Federal legislation covers federal government employees including Crown agencies and corporations across Canada.

Provincial Legislation

In each province or territory, there is an act (often called the Occupational Health and Safety Act) that applies to most workplaces in that region.

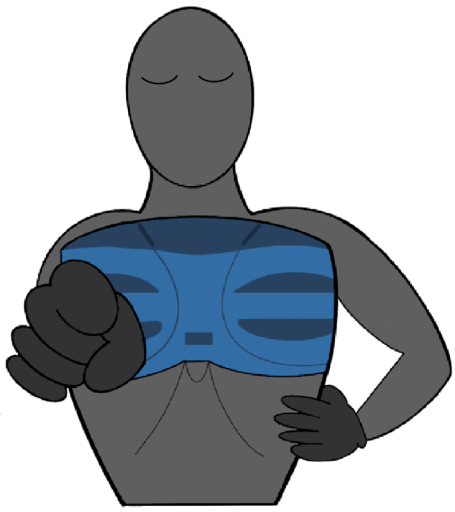
Administration of Medication

First Aiders can assist with administering medication if the casualty requests or requires assistance. Sometimes a casualty may take their medication orally, sometimes it may be injected, and other times they may be inhaled or absorbed. Some common medications that are discussed in First Aid Courses include: epinephrine, ASA, ventolin, naloxone, Nitroglycerin, and glucagon.

All of these medications are simple to administer and commonplace.

Reporting and Documentation Requirements in the workplace:

Employers and workers both have responsibilities concerning reporting workplace injuries. **Workplace First Aiders should follow their workplace documentation guidelines.**



Did you know? First aiders are required to document all incidents that occur in the workplace!

Principles of Effective Communication

Effective communication is crucial when administering first aid for clear understanding and coordination among responders, casualties, and bystanders.

Effective Communication Principles:	Communication Challenges:
Introduce yourself by name and tell the casualty you are a first aider. Once introduced to the casualty, try to use their name. Clarity: Use clear and simple language to convey instructions and information. Active Listening: Listen attentively to the injured person. Pay attention to their concerns, questions, and feedback, and respond appropriately. Calmness: Maintain a calm and composed demeanour, even in high-pressure situations. Nonverbal Communication: Pay attention to nonverbal cues such as body language and facial expressions. Make and maintain eye contact. Team Coordination: If working with other responders, maintain clear communication and coordination to ensure everyone is aware of their roles.	Physical Barriers: Environmental factors, such as loud noises, poor lighting, or crowded spaces, can create physical barriers to communication. When confronted with physical barriers to communications rescuers could consider moving the casualty to a calmer area, shutting down machinery or having bystanders leave the area. Cognitive Barriers: Cognitive impairments or disabilities, such as confusion, disorientation, or impaired consciousness due to injury, can hinder communication. First aiders should use simple language and speak slowly. Language Barriers: Differences in language or dialect between the first aid provider and the casualty, or among responders, can impede communication. Consider the use of electronic or app translators when possible.

Emergency Medical Services (EMS)

Emergency Medical Services (EMS) play a crucial role in providing rapid and effective care to individuals in need of assistance.

Alerting EMS

- Most areas in Canada use 911.
- Do not leave the casualty if possible, ask a bystander to phone EMS and place the phone on speaker mode.

The Call

- When calling it is important to quickly provide the problem and location.
- Ideally a civic number should be made available to the 911 operator.
- Provide additional information as requested.
- Stay on the line until EMS tells you to end the call. Follow all instructions from the dispatcher and use speaker mode on your mobile device.

Assisting EMS

- Once EMS arrives on the scene, ensure someone is there to meet them and direct them to the casualty.
- Once EMS arrives they may request assistance and information.
- EMS may ask the first aider to move to an adjacent area to provide the casualty privacy.

Utilising Bystanders:

If bystanders are present the first aider should consider asking bystanders to:

- Call 911
- Meet EMS
- Gather first aid equipment
- Keep scene clear for EMS

First Aid Kits & Equipment

The type, size, and number of first aid kits you will need depend on three factors:

- How many employees are in your workplace,
- Whether your workplace is an office or not, and
- How far away you are from emergency medical services

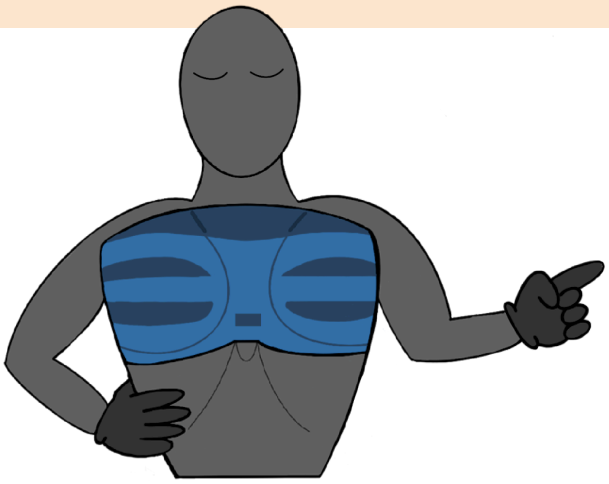
Workplace First Aid Kits

Local guidelines and legislations dictate kit requirements:

CZA1220, First Aid Kits for the Workplace, lays out general requirements for workplace first aid kits. and sets minimum requirements for their contents.

First Aiders should:

- Know the location of first aid kits in the workplace.
- Be familiar with kit contents
- Be aware of regular inspection requirements



Did you know? It is important to routinely inspect your workplace first aid kit to ensure it is tidy, and properly stocked!

Workplace First Aider Safety and Personal Protection

Personal Protective Equipment

Gloves

Wear gloves to prevent direct contact with blood, bodily fluids, or contaminated surfaces.

Remove gloves carefully to avoid contamination.

If gloves are not available: casualties may be able to assist in their own care without the first aider coming into direct contact with them.

Barrier Devices

Pocket mask, bag valve mask and face shields.

These are all forms of barrier devices that provide some protection against cross-contamination.

Post Incident Cleanup

First aid kits contain biohazard bags.

Any contaminated equipment, supplies, and packaging should be disposed of in a biohazard bag.

Common routes for diseases and infections:

To minimize the spread of diseases and infections, wear appropriate personal protective equipment.

Procedures for the Clean-up and Disinfection of Workplace Equipment

- **Soiled** material or equipment used in a workplace first aid incident, such as CPR masks or shields, scissors, tweezers etc. should be disposed of immediately. The material should be placed in a Biohazard bag.
- **Solid or Liquid biohazardous** waste is any non-sharp material that comes into contact with any casualty.

Disposal of Sharps and contaminated supplies

- Common examples of sharps include needles, syringes, lancets, scalpels, etc.
- Do Not Recap, bend or cut needles. Dispose of needles directly into the sharps container.
- Dispose of sharps containers when they are **almost full**.

Occupational Health and Safety (OHS)

A *hazard* is any potential source of harm or danger that can cause injury, illness, or damage to individuals, property, or the environment.

Examples of workplace hazards include:

- Slippery floors or uneven surfaces
- Hazardous chemical spills or leaks
- Falling objects or materials
- Electrical Hazards
- Flammable materials or substances

Process of handling workplace hazards:

1. Hazard Identification:
- Employ a systematic approach to identify all potential hazards present in the workplace.

2. Risk Assessment:
- Assess the level of risk associated with each identified hazard by considering the likelihood of occurrence and the severity of potential harm.

3. Control Process:
- Implement control measures following the hierarchy of controls, prioritizing elimination, substitution, engineering controls, administrative controls, and personal protective equipment (PPE) in descending order of effectiveness.

4. Implementation:
- Communicate hazard identification, risk assessment findings, and control measures to all relevant personnel, including workers, supervisors, and management.

MSDS/SDS:

Material Safety Data Sheets (MSDS), now commonly referred to as **Safety Data Sheets** (SDSs) are documents that provide detailed information about hazardous chemicals in the workplace. These sheets are an essential source of information for Workplace First Aid.

Assistance to first aid in the workplace:

- Products classified as a "hazardous product" that are intended for use in a workplace in Canada must have a SDS.
- SDS's contain information about the chemical composition of hazardous substances, including their ingredients, properties, and potential hazards.
- SDS's provide guidance on appropriate first aid measures to be taken in the event of exposure or injury involving hazardous chemicals.

Role of a Workplace First Aider in an OHS Management System:

First Aiders should know:

- Procedures to be followed when first aid is required - including what types of injuries should be reported.
- Location of first aid room and/or first aid kit(s).
- Location of a list of first aid attendants which indicates where to find the attendant or a telephone number.
- Location of a list of nearest medical facilities.
- Location of a list of the organization's key personnel by name, title and telephone numbers that are prioritized by "call first, call second, etc."

Principles of OHS Legislation:

These regulations are intended to protect workers from hazards in their workplace. Stakeholders should cooperate to make the workplace safe for everyone.

Management of Ill/Injured Workers

It's a real life situation:

A lifeguard in Nova Scotia was on his way to work. While driving by Sullivans Pond he saw a man lying in the street with a few people standing nearby.

He parked his car and approached the scene.

The man's name was Tim, and he had been struck by a car while using the crosswalk.

The lifeguard asked some bystanders to help direct traffic; he asked one person to hold Tim's head steady to minimize neck movement, while another called 911.

Tim was bleeding from the side of his head, so the lifeguard used a piece of gauze from his cars first aid kit to control the bleeding.

The quick actions of this lifeguard demonstrated appropriate first aid.

Learning Objectives

- Knowing how to conduct scene assessments.
- Understanding and conducting a primary assessment.
- Understanding and conducting a secondary assessment.
- Performing ongoing care and assessments to casualties.

CSA Standards

L.2 Management of Ill/injured workers
L.2.1 Scene management
L.2.2 Primary Survey
L.2.3 Secondary Survey
L.2.4 Ongoing assessments

Emergency Scene Management

Emergency Scene management consists of 4 steps:

- Scene Assessment
- Primary Assessment
- Secondary Assessment
- Ongoing care

Scene Assessment

"Is it safe?"
"What happened?"
"Injury or illness?"
"Anyone trapped?"

- Before entering the scene, ensure your safety by assessing for potential hazards such as fire, hazardous materials, or unstable structures.
- Determine the Mechanism of Injury (MOI) and History of the scene and consider potential injuries.
- Identify yourself as a workplace first aider and obtain consent from any casualties before acting.
- Call EMS immediately if the scene is unsafe or beyond your ability to manage.

Primary Assessment

- Assess the casualty's level of consciousness.
  - **Alert -** conscious and oriented
  - **Verbal** - responds when spoken to
  - **Pain -** only responds to painful stimulus
  - **Unconscious -** does not respond to any stimulus
- Check ABCs
  - Airway: Is it open and clear.
  - Breathing: Feel, listen and look for signs of breathing.
  - Circulation: Look for signs of severe bleeding.
- Life-threatening injuries or conditions are those that are classified by the ABCs i.e anything that affects consciousness, the quality of breathing and the circulation of blood.

Secondary Assessment:

If there are no life threatening conditions the first aider should perform a secondary assessment.
Performing a secondary assessment is a step to assess and address any injuries or conditions that may not have been immediately evident during the primary assessment. The secondary assessment involves, asking about medical history, taking vital signs, and performing a head to toe examination.

Medical history

First aiders should question the casualty and persons present in the accident.

Think about: What happened to the casualty? Where does the casualty hurt? Are there any relevant medical conditions or allergies?

Allergies - Does the person have any allergies?

Medication - Is the person on any medication?

Previous medical history - Has the casualty had any relevant previous surgeries or health problems?

Last meal - When and what did the person last eat?

Event - What happened?

Vital Signs

Checking for vital signs means checking the ABCs regularly.

There are five vital signs that show the basic condition of the casualty:

1. Level of consciousness
2. Quality of breathing
3. Pulse
4. Skin condition and temperature
5. Pupils

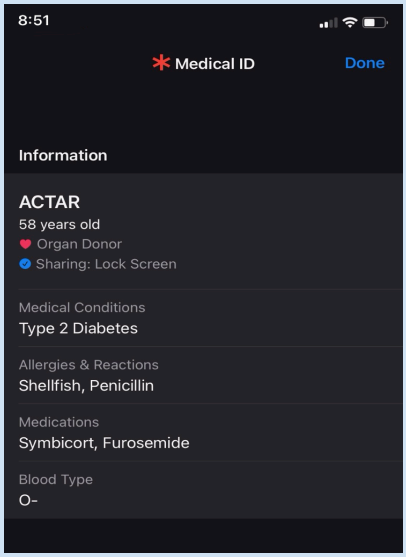
Head-to-Toe Examination of the casualty:

With a conscious casualty, asking questions like these will often be sufficient:

- "How do you feel?"
- "Where does it hurt?"

If a head to toe check is required, inspect the casualty for any blood, muscle/joint injuries, or tenderness. Inspect and ask about the following areas:

- Head and neck
- Abdomen
- Chest
- Back
- Legs and arms



Medical ID in health app, accessible from lock screen

Step-by-Step

Scene Assessment

- Assess the scene for safety hazards. - If the scene is unsafe, remain in a safe location, and call 911.	**Mechanism of injury (MOI):** Is there a potential head/spinal injury? **Assess for safety hazards** **Am I safe?** **Illness or injury?**	• Take charge of the situation • Gain permission to help • Remove hazards from the scene, if necessary

Primary Assessment

- Initial assessment of casualties. - Assess ABCs and LOC.	**Check for Level of Consciousness** A - Alert V - Verbal P - Pain U - Unconscious **Check ABCs**	• Call EMS for unresponsive casualties • Treat ABCs immediately • Treat for shock

Secondary Assessment

- Gathering information on the casualties condition. - Obtain information that was not gained in the primary assessment.	"What happened?" "Where does it hurt?" "Any other relevant medical conditions or allergies?" Check and monitor vital signs. Head-to-toe examination.	• Record: History, Vital Signs and Injuries • Treat for shock and any injuries

Ongoing casualty care:

Continue to care for the casualty until EMS arrives or someone takes over.

- Continue to monitor the casualties ABCs and overall condition, treating any injuries as necessary.
- Report to the Emergency Medical Responders when they arrive.

Recovery Position

- Kneel beside the person.

- Place their near arm up along their head with the palm facing upward.

- Cross their far arm over their chest, resting the hand on their cheek.

- Bend their far knee to a right angle.
- Grab their far shoulder and knee.
- Roll them towards you onto their side, ensuring their airway is open.

Airway & Breathing Management

It's a real life situation:

"An estimated 44 children age 14 and under die every year in Canada from choking, suffocation and strangulation, and another 380 are hospitalized for serious choking injuries."

Breathing emergencies, such as choking, are a major cause of injury-related deaths among children in Canada.

Learning Objectives

- Understanding the implications, risks, and basic procedures for airway management.
- Understanding the respiratory system and its components.
- Knowing how to approach, assess, and provide care for respiratory emergencies.
- Being able to clear an airway obstruction.

CSA Standards

L.3 & L.4 Airway and breathing Management
L.3.1 Basic airway management
L.3.2 Advanced airway management
L.4.1 Respiratory System
L.4.2 Management of respiratory emergencies

Airway Management

Opening the Airway:

A conscious casualty will generally be able to maintain their own airway.

To maintain an open airway with an unconscious casualty, place one hand on the casualty's forehead and gently tilt the head back, while lifting the chin with the other hand.

Clearing the Airway:

If the airway is blocked, turn the head and use finger sweeps to clear it of any obstructions, such as vomit, blood, or foreign objects.

Maintaining an Open Airway

Recovery Position: This position is ideal for unconscious casualties who are breathing normally. It helps prevent the tongue from falling back and obstructing the airway. Also this position helps keep the airway clear if there is vomiting.

For a conscious casualty, they should be positioned in a comfortable sitting or reclined position.

The Lungs:

Breathing: Involves inhaling air and exhaling carbon dioxide. Air flows into the nose or mouth. It travels down the throat, through the windpipe (trachea), and into the two divisions of the lungs known as bronchi.

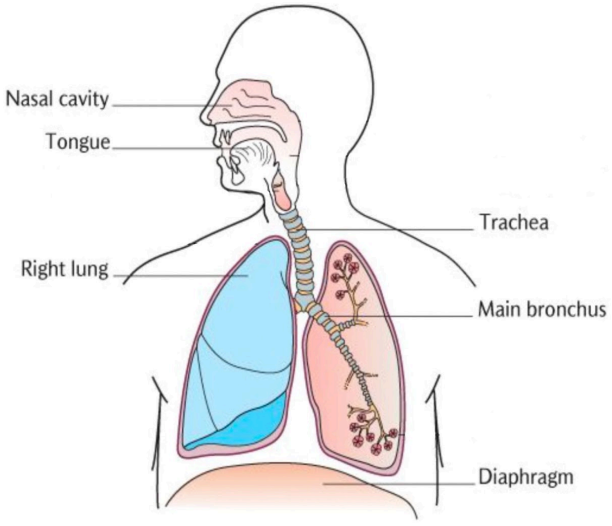
Indications of Effective Breathing

Effective breathing involves the efficient exchange of oxygen and carbon dioxide, supporting bodily functions.

Indications of a effective breathing include:

- Normal skin color
- Mental alertness
- Normal chest movements
- Ineffective breathing may include:
    - Irregular breathing patterns
    - Bluish discoloration of the skin (cyanosis)
    - Wheezing, gasping, or a sense of suffocation
- Individuals who are unconscious may have compromised airways due to loss of muscle tone or obstruction.

The Respiratory Process



Gas Exchange: Within the lungs, tiny air sacs facilitate the exchange of gases between the air and the bloodstream. Oxygen diffuses into the bloodstream, while carbon dioxide diffuses from the blood into the lungs to be exhaled.

Breathing Management

Asthma

Asthma is a medical condition where inflammation and narrowing of the airways occur.

Symptoms include; wheezing, especially during exhaling, shortness of breath, chest tightness, pain, or coughing.

Common Asthma Triggers:

- Exposure to allergens, such as pollen, dust mites, or pet dander.
- Respiratory infections, exercise, cold air, or irritants in the environment.

Long-term medications, taken regularly to control asthma and prevent symptoms, include inhaled medications, through puffers.

Flail Chest

Flail chest is characterized by a segment of the rib cage becoming detached from the rest of the chest wall. This detachment occurs when multiple rib fractures occur, involving at least three adjacent ribs which break in two or more places.

Flail chest results in undesired movement of the affected part of the chest wall during breathing.

This means that while the rest of the chest wall moves outward during inhalation, the flail segment moves inward. Flail chest can lead to significant respiratory compromise.

Treatment of flail chest focuses on stabilizing the chest wall and improving respiratory function.

Chronic Obstructive Pulmonary Disease (COPD)

Chronic Obstructive Pulmonary Disease (COPD) is a lung disease characterized by airflow limitation. It encompasses several conditions, including chronic bronchitis and emphysema.
Common symptoms include; wheezing, chest tightness, frequent respiratory infections, and a chronic cough.

Pneumothorax

A life-threatening condition in which air continues to accumulate within the pleural space, the thin cavity between the lungs and underneath the chest wall, causing increasing pressure on the lungs and heart. This can lead to respiratory distress, cardiovascular compromise, and cardiac arrest. Symptoms include sudden onset of sharp chest pain, rapid heart rate, shortness of breath or difficulty breathing, especially during exertion.

A Penetrating Chest Injury:

A penetrating chest injury is an injury that involves a foreign object piercing or entering the chest cavity. These injuries can cause damage to the structures within the chest, including the lungs, heart, major blood vessels, and surrounding tissues.
If the object is still in place, <u>do not</u> remove it.
Symptoms include:

- Coughing up blood
- Rapid or weak pulse
- Low blood pressure
- Signs of shock

Sucking Chest Wound

A sucking chest wound is a chest injury in which a hole in the chest wall allows air to enter the area between the lungs and the chest wall (pleural space). This injury can lead to pneumothorax.

Airway obstructions:

Airway obstruction occurs when there is a blockage in the pathway that leads to the lungs. This obstruction can impede the flow of air, leading to a life-threatening situation. When the airway is obstructed, the supply of oxygen to the body is compromised, which will cause severe consequences if not addressed. Airway obstruction in a conscious casualty can be caused by inhaled objects, drowning. In an unconscious casualty, airway obstruction can be caused by the tongue, vomit, and blood.

Conscious choking casualties:

Casualty cannot Speak, Breathe or Cough:

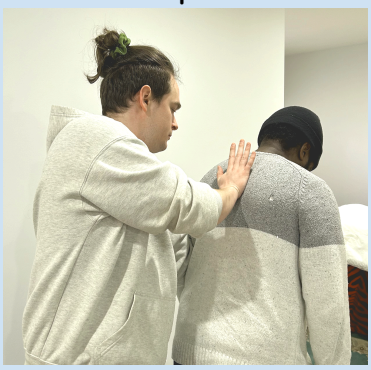
- Hands around neck area
- Flailing arms and bulging eyes
- Unable to cough and speak

Partially Obstructed:

- Laboured breathing
- Making wheezing or raspy noises

Child/Adult:

Back blows position one



Back blows position two

Abdominal thrusts

Assess the Situation/scene assessment: Approach the choking casualty and assess the severity of their condition. Determine if they are conscious and partially, or fully obstructed.

- If casualty is partially obstructed, encourage them to cough to attempt to clear their own airway

If the casualty cannot speak, breathe or cough effectively:

- Perform Back Blows:
  - Stand slightly to one side behind the choking casualty.
  - Lean the casualty forward slightly to support their upper body.
  - Deliver five back blows between the shoulder blades using the heel of your hand.
- Perform Abdominal Thrusts:
  - Stand behind the choking casualty and place your arms around their waist.
  - Make a fist with one hand and place the thumb side of your fist against the casualties abdomen, slightly above the navel and below the rib cage.
  - Grasp your fist with your other hand.
  - Perform a quick upward thrust into the abdomen, using inward and upward pressure.
  - Repeat abdominal thrusts up to five times, if necessary.
- Continue to alternate five back blows and five abdominal thrusts
- If the casualty becomes unconscious or the obstruction cannot be cleared, activate EMS

Infant Choking

Chest thrusts on wheelchair user

Infants:

Perform back blows:

- Sit or kneel and hold the infant face-down on your forearm, with their head lower than their chest.
- Support the infant's head and neck with your hand, ensuring their airway is open.
- Deliver up to five back slaps between the shoulder blades using the heel of your hand.

Perform chest compressions:

Turn the infant over onto their back, supporting their head and neck with your hand.

1) Place two or three fingers in the center of the infant's chest, just below the nipple line.
2) Perform five chest thrusts, pushing straight down about 1.5 inches (around 4 cm), with rapid and firm pressure.

Continue alternating between five back blows and five chest thrusts, until the airway is clear, or until the casualty loses consciousness

Pregnant/Wheelchair/Seated:

Perform back blows:

- Stand to the side of the casualty and perform back blows.
- Avoid placing excessive pressure on the abdomen in a pregnant casualty.

Perform chest thrusts:

- If the casualty is pregnant, avoid abdominal thrusts to prevent harm to the fetus.
- Perform chest thrusts by standing behind the casualty, wrapping your arms around their chest, and pulling directly inwards with both hands on the middle of the breastbone.

Continue alternating between five back blows and five chest thrusts, until the airway is clear, or until the casualty loses consciousness

Unconscious choking casualties:

If the patient with an obstructed airway is unconscious:

- Activate EMS immediately
- Perform 30 chest compressions
- Open the casualties mouth, and clear obstruction, if possible
- If obstruction cannot be cleared, continue repeating 30 compressions, followed by attempting to clear the obstruction

Choking Self-rescue:

- Do not panic and alert EMS
- **Perform Self-Administered Abdominal Thrusts:**

    a) Make a fist with one hand and place it slightly above your navel, below the rib cage.
    b) Press inward and upward with quick thrusts to create pressure on your diaphragm, ideally using a heavy piece of furniture to press your first against
    c) Repeat self abdominal thrusts until the obstruction is dislodged.

Circulation Management

It's a real life situation:

A Halifax man was resuscitated by a group of strangers while suffering from cardiac arrest in June of 2023.

The 50 year old man was walking to work when he went into cardiac arrest and became unresponsive.

An onlooker immediately called 911 and began performing CPR.

"I'm just glad to be alive," said the man.

The rescuer said, "I believe I was supposed to be there, He was not ready to go"

The paramedic said the incident was an example of an effective "chain of survival" that starts with "the bystander's early recognition of cardiac arrest and then activation of the emergency system".

Learning Objectives

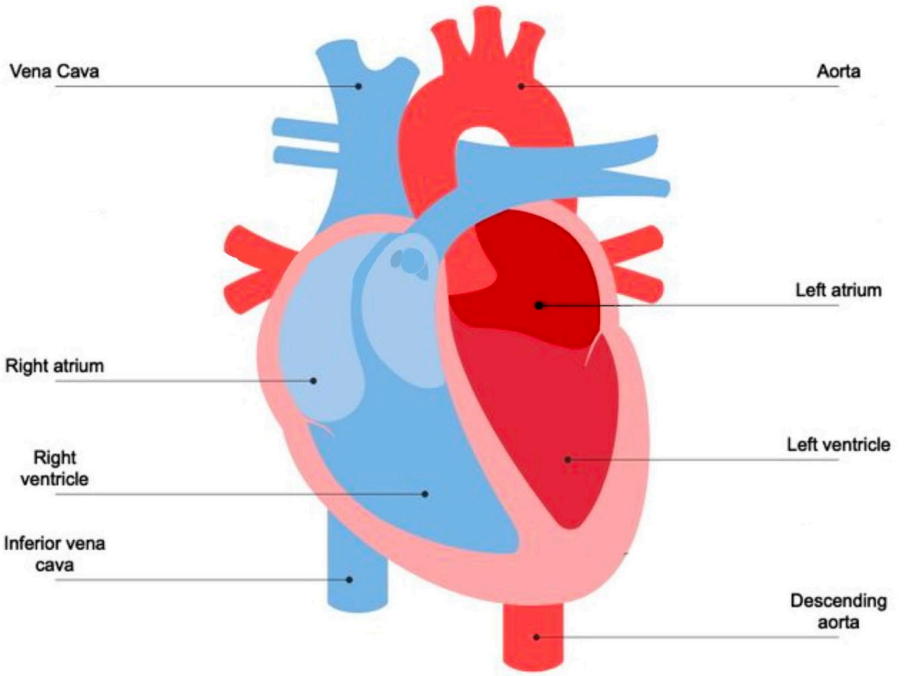
- Awareness of the major structures and functions of the circulatory and nervous systems.
- Approach, assess, and provide workplace first aid for cardiovascular emergencies.
- Understanding the management for shock.
- Skills to Perform CPR.
- Skills to apply and use an AED.

CSA Standards

L.5 Circulation Management
L.5.1 Circulatory System
L.5.2 Management of cardiovascular emergencies
L.5.3 Nervous System
L.5.4 Management for shock
L.5.5 Cardiopulmonary Resuscitation (CPR)
L.5.6 Automated external defibrillation (AED)

The Circulatory System

The Heart:



Structure: The heart is a muscular organ located in the chest cavity. It consists of four chambers separated by valves: two upper chambers and two lower chambers.

Function: The heart is a pump that circulates blood throughout the body. It receives oxygenated blood from the lungs into the left upper chamber, pumps it to the body through the aorta, receives deoxygenated blood from the body into the right upper chamber, and pumps it to the lungs for oxygenation. Valves in the heart keep blood flowing in the proper direction.

Blood vessels:

There are three types of blood vessels.

Arteries: Blood vessels that carry oxygenated blood away from the heart to the body's tissues and organs. Blood in the arteries is under pressure.

Veins: Blood vessels that carry deoxygenated blood from the body back to the heart.

Capillaries: Tiny blood vessels that connect arteries to veins.

The Blood:

A fluid that carries oxygen and other materials necessary for life.

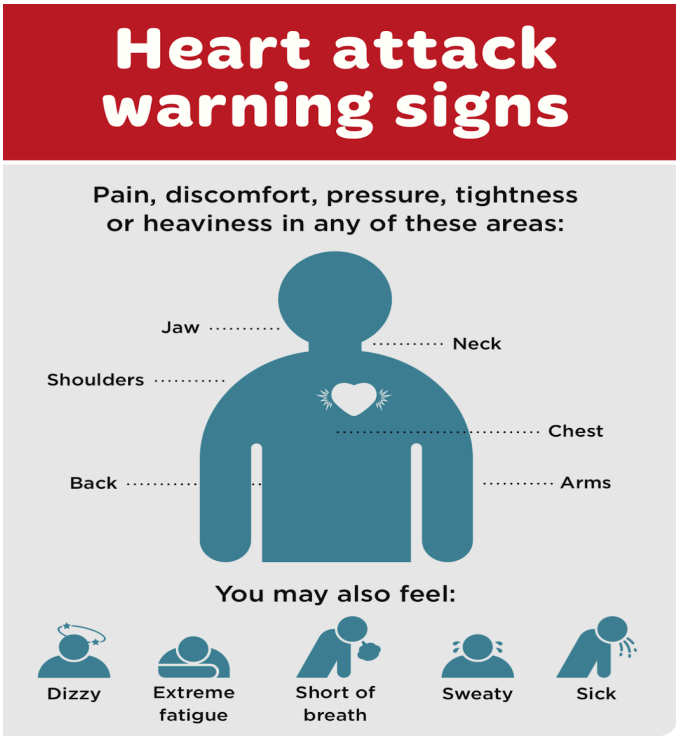
Management of Cardiovascular Emergencies

Heart Attack

A heart attack occurs when blood flow to a section of the heart becomes blocked and some heart muscle doesn't get oxygen. Depending on how long the blood supply is cut off, the damage can cause lifelong problems. In many cases a heart attack can be fatal.

As a First Aider:

- If you suspect a heart attack, call 911 and ask someone to find an AED.
- Have the casualty stop all physical activity immediately.
- Chew Aspirin, on the advice of 911.
- Have the casualty rest and wait until help arrives.
- If condition worsens update EMS.



The most common heart attack symptom is chest discomfort; however, not everyone experiencing a heart attack will experience chest discomfort. They may experience shortness of breath, pressure or pain in the chest or abdomen, dizziness, fainting, upper back pressure, extreme fatigue, or excessive sweating.

Denial of Symptoms:

Denial of their condition is common in heart attack casualties. Most people delay up to 2 hours before seeking help. (Heart and Stroke Foundation).

Atherosclerosis

Atherosclerosis is the buildup of substances on artery walls, narrowing and hardening them over time. This restricts blood flow, leading to conditions like heart attack or stroke. Risk factors include high cholesterol, high blood pressure, smoking, diabetes, and inactivity.

Angina

Angina is a medical condition that can cause chest pain or discomfort when the heart muscle doesn't receive enough oxygen-rich blood.

Symptoms:
Discomfort, pressure, squeezing or pain in the chest. The pain may also radiate to the arms, shoulders, jaw, neck, or back.

Management:

- Call 911
- If requested, assist them in taking their prescribed nitroglycerin.
- Keep the patient comfortable until help arrives.

Nitroglycerin spray

Cardiopulmonary Resuscitation (CPR)

CPR moves oxygenated blood to the brain and oxygenated blood to the heart muscle itself. CPR significantly increases a casualties chances of survival.

Cardiac Arrest:

Cardiac arrest is a common medical emergency where the heart stops beating effectively, leading to loss of consciousness and lack of normal circulation. In Canada, over 60,000 people suffer from out of hospital cardiac arrest each year.

The most common cause of sudden cardiac arrest is a heart attack, other possible causes include:

- Drug Overdose
- Drowning
- Electrical Shock
- Stroke
- Suffocation
- Congenital Heart Defects

To Perform CPR:

- Scene and Primary assessment, check for responsiveness - if unresponsive, alert EMS
- Check airway and breathing:
    - Head tilt, chin lift
    - Place your ear close to the casualties mouth and nose area, look towards the casualties chest, and check for breathing for 5 seconds
    - If the casualty is not breathing, start 30 chest compressions, followed by 2 breaths into the casualties mouth. If you are not comfortable or unable to give rescue breaths, perform compression only CPR
    - Continue performing CPR, or compression only CPR, until someone else takes over, or the casualty starts breathing

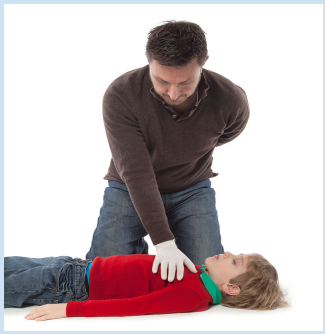
Chest compressions:

- Place the heel of one hand on the center of the person's chest (usually between the nipples).
- Place the other hand on top of the first hand.
- Position your shoulders directly above your hands.
- Keep your arms straight and use your body weight to push down firmly and quickly on the chest.
- Perform 30 compressions at a rate of about 100-120 compressions per minute (approximately 2 compressions per second).
- Allow the chest to recoil completely between compressions.

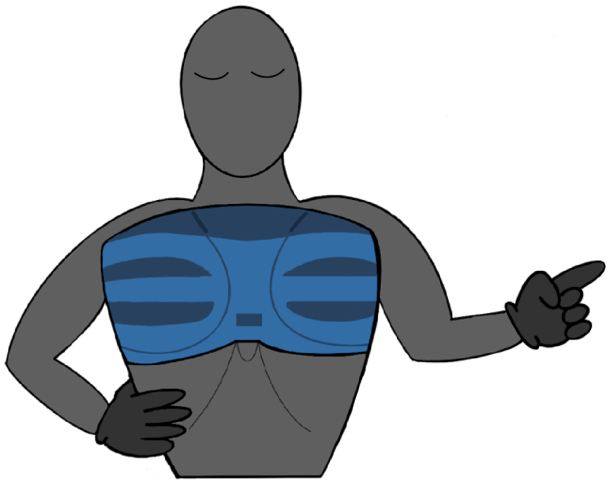
Rescue Breaths:

- After 30 compressions, tilt the casualties head back slightly and lift the chin to open the airway.
- Pinch the person's nostrils closed.
- Take a normal breath and place your mouth completely over the casualties mouth, making sure to create a good seal.
- Breath into the person's mouth for about 1 second to make the chest rise.

Overview on CPR:

PUSH Hard & PUSH Fast	Adult 	Child (1yr-puberty) 	Infant (Less than 1yr) 
Hand placement	Place both hands interlocked on the lower half of the breastbone.	Place one or both hands interlocked on the lower half of the breastbone.	Use two fingers to compress the center of the infant's chest, just below the nipple line.
Compressions and breaths:	30:2	30:2	30:2
Depth of compressions	Compress the chest at least 2 inches (5 centimeters).	Compress the chest about 2 inches (5 centimeters).	Compress the chest about 1.5 inches (about 1/3 the depth of the chest).
Rate of compressions	100-120 per minute	100-120 per minute	100-120 per minute
When to alert EMS	Immediately	Immediately, if possible. If alone, perform 5 cycles of CPR (2min), and then activate EMS.	Immediately, if possible. If alone, perform 5 cycles of CPR (2min), and then activate EMS.

CPR hand placement



Did you know? 911 operators will give you instruction on how to perform hands-only CPR!

Remember!

- Do not interrupt chest compressions for more than 10 seconds at a time.
- Do not stop unless:
    - The scene becomes unsafe
    - 911 takes control
    - You are too tired to continue
    - Another trained rescuer takes over

Chest compressions on pregnant casualties:

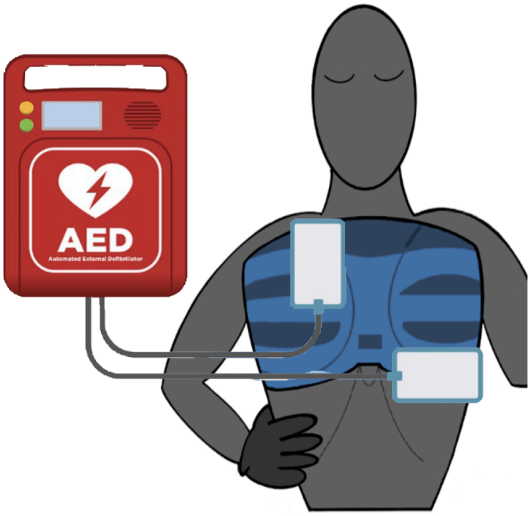
- Place a towel or small pillow under the right hand side of the patient.
- Hand placement for CPR is the normal position, depth and rate are also the same.
- AEDs should be used on the pregnant casualty in cardiac arrest. There is no difference with the placement of the AED pads.

Automated External Defibrillator (AED)

Defibrillation is a procedure used to treat life-threatening conditions that affect the rhythm of the heart. Defibrillation involves delivering an electric shock to the heart. While using an AED, two electrode pads are placed on the casualties bare chest.

How it works:

The defibrillator analyzes the heart's electrical activity through the pads placed on the casualties chest.
The AED will assess the casualty, to determine if the heart is in a shockable rhythm. If a shockable rhythm is found, the AED will deliver a shock in an attempt to restore regular heart function.



Using an AED:

1	**Set up the AED:** If possible, begin CPR immediately while another first aider sets up the AED. If alone, call 911 and set up the AED immediately. The AED will guide you through the process as soon as it is turned on.
2	**Detection:** The defibrillator analyzes the heart's electrical activity through the pads placed on the casualties chest. During this step, the AED will advise you to not touch the casualty. It will assess if the heart rhythm is shockable.
3	**Charge:** If a shockable rhythm is detected, the defibrillator charges itself to deliver an electric shock. If a shockable rhythm is not detected, the AED will advise you to resume CPR.
4	**Shock Delivery:** Once charged, the defibrillator is ready to deliver a shock, some AEDs will deliver the shock automatically while some require the first aider to press a button. The shock is designed to briefly stop the heart's electrical activity, allowing the heart's natural pacemaker to reset and hopefully restore a normal rhythm.
5	**Monitoring:** After the shock is delivered, the defibrillator continues to monitor the heart's rhythm. It may advise further shocks if necessary, or prompt the operator to perform CPR if the heart remains in a non-shockable rhythm.

If a shockable rhythm is not found:

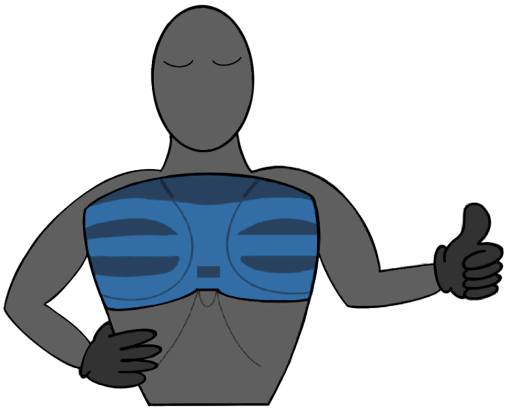
- The AED will not deliver a shock, and will advise you to resume CPR. If the patient is not breathing, start or continue CPR.
- The AED will perform an assessment on the casualty's heart every 2 minutes.
- Continue to perform CPR until the AED begins another assessment.
- Continue CPR and follow the AED prompts until EMS arrives, or the casualty begins breathing again.

Special Considerations and Situations:

- **Hairy chest:** If the casualty has a very hairy chest, quickly shave using a razor to ensure good contact between the pads and the skin. Good contact is essential for the AED to accurately detect the heart rhythm and deliver effective shocks.
- **Pregnancy:** If the casualty is pregnant, the AED should be used.
- **Implanted devices:** If the casualty has an implanted pacemaker or defibrillator, place the AED pads at least 1 inch (2-3 cm) away from the implanted device.
- **Water or wet conditions:** If the casualty is in a wet environment (e.g., swimming pool, rain-soaked ground), quickly move them to a dry area before delivering a shock.

AED Equipment Inspection:

- Check to ensure the pads, batteries and all accessories are with the AED.
- **Self-Test:** Most AEDs perform regular self-tests. Check for a green status indicator or confirmation that the self-test has passed successfully. If the AED failed the self test, it will let you know through its indicator or through an audible alert.
- Ensure the AED has up-to-date instructional materials, including user manuals and emergency response protocols specific to your workplace or location.
- Clean the AED regularly as per manufacturer's recommendation.

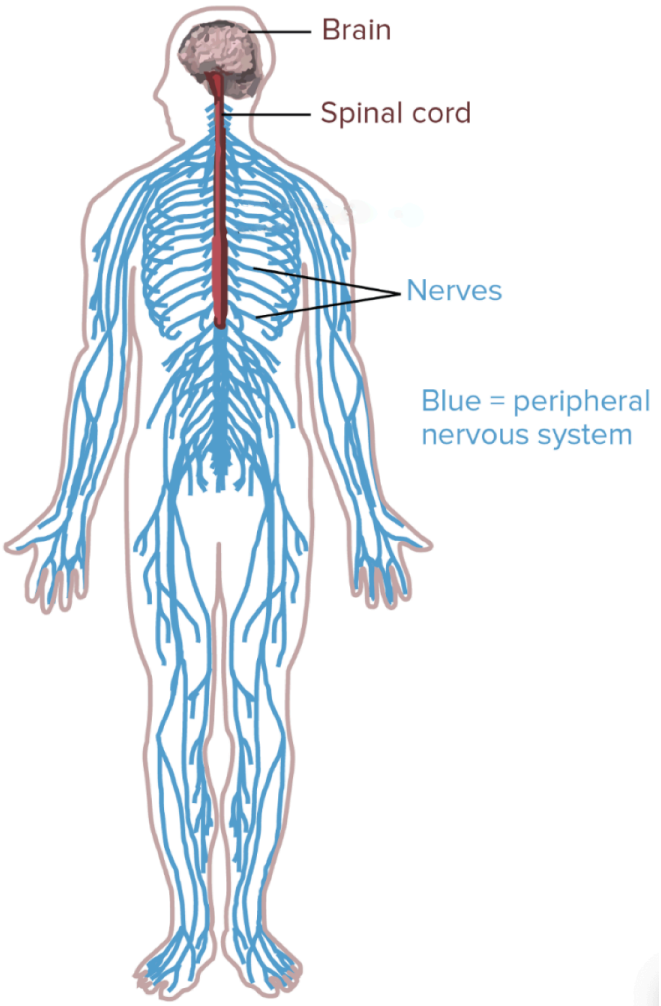


Did you know? AED's always give vocal instructions and walk you through the process of using it!

The Nervous System

The nervous system is a network of cells and tissues that regulates and coordinates the activities of the body.

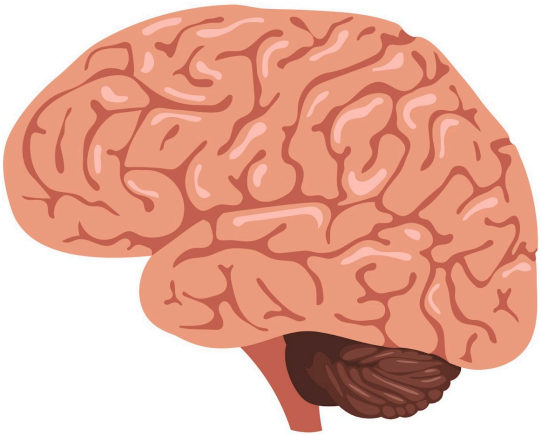
The Nervous System:



Nerves: Bundles of nerve fibers that transmit sensory information to the brain and motor signals from the brain to body.

One system of nerves regulates involuntary bodily functions such as heart rate, digestion, respiratory rate.

- **Sympathetic Nervous System:** Prepares the body for "fight or flight" responses in stressful situations and tries to overcome the adverse effects of shock.



The Central Nervous System (CNS):

- **The Brain** is the command center of the nervous system, responsible for processing sensory information, initiating responses, and controlling bodily functions. It consists of several regions with specific functions.
- The **Spinal Cord** acts as a pathway for sensory and motor information between the brain and the rest of the body. It also controls reflex actions and certain automatic responses.

Management for Shock

Shock is a state of circulatory failure as a result of insufficient oxygen to the brain. If the condition continues, organs will fail and death will follow. Shock is the body's response to a sudden drop in blood pressure.

Types of Shock Include:

- **Cardiogenic Shock:** Due to failure of the heart to pump effectively, often from a heart attack (myocardial infarction) or severe heart failure.
- **Anaphylactic Shock:** Resulting from a severe allergic reaction triggering widespread vasodilation and bronchoconstriction.
- **Hypovolemic Shock**: Caused by a significant loss of blood or fluids, such as from trauma, severe dehydration, or internal bleeding.

Signs and Symptoms:

- Pale Skin
- Cold
- Hypotension: Low blood pressure
- Rapid heart rate: (typically greater than 100 beats per minute)
- Altered Mental Status: Confusion, agitation, or loss of consciousness
- Cool, Pale, Clammy Skin
- Weak or Absent Peripheral Pulses:
- Weakness, Fatigue, or Dizziness
- Anxiety
- Trembling & laboured breathing

Management:

- Perform a scene assessment
- Primary assessment
- Call 911
- ABCs: Assess and manage the Airway, Breathing, and Circulation. Ensure the person has an open airway and adequate breathing.
- Monitor and continue care for the casualty.

To help prevent shock from becoming more severe:

- Loosen any tight clothing
- Keep the casualty warm
- Reassure the casualty
- Place the casualty in a comfortable position

Injury Management

It's a real life situation:

In August of 2022 a Nova Scotia man who was hit by a car and nearly died says a volunteer firefighter from New Brunswick saved his life.

The casualty said, "The blood was just kind of pouring out, it wasn't squirting. It was literally just like a faucet. Me and the first guy tried to put a belt on there and a few towels and stuff to get it to stop but it kind of kept pouring,"

The volunteer firefighter from Shediac River, N.B., told CBC *As It Happens,* he pulled over to help after seeing all the blood gushing out of the man. He was on his way back to New Brunswick, but had decided to take the scenic route. He didn't know at the time it would be a life-or-death decision.

Learning Objectives

- Recognise major and minor haemorrhage.
- Controlling internal and external hemorrhage.
- Management of ear, eye and nose injuries.
- Understand types and classifications of burns and the management of them.
- Understanding the Musculoskeletal system and splinting.

CSA Standards

L.7 Injury Management
L.7.1 Internal and external haemorrhage
L.7.2 Ear, eye, and nose injuries
L.7.3 Burn management
L.7.4 Management of Musculoskeletal system injuries

Internal and External Hemorrhage

Major and Minor External Bleeding:

External bleeding can range from minor cuts to severe wounds.

The severity of external bleeding can vary. Factors such as the casualties age, weight, and general physical condition may impact the casualty.

Bleeding looks different from different blood vessels:

Arteries:	Veins:	Capillaries:
Gushing, spurting blood Bright red	Steady flow, Darker red	Slow, even flow

Management of major bleeding

- Assess the situation for safety.
- Alert EMS as soon as possible.
- Check ABCs.
- Get the casualty to rest.
- Apply direct pressure to the wound, ideally with sterile gauze.
- Maintain pressure continuously. If bleeding persists, apply more dressing on top rather than removing the soaked one.
- After bandaging monitor for signs of circulation.
- Treat for shock and ongoing care.

Management of minor bleeding

- Assess the situation for safety.
- Check ABCs.
- Get the casualty to rest.
- Apply direct pressure to the wound, ideally with sterile gauze.
- Maintain pressure continuously. If bleeding persists, apply more dressing on top rather than removing the soaked one.
- If bleeding continues for 20 minutes or longer, seek medical assistance.

Use of Tourniquet:

For severe bleeding from an extremity, apply a tourniquet above the wound if direct pressure cannot control bleeding. Once applied, it should not be removed. Ideally the rescuer should record the time a tourniquet is applied. Application of a tourniquet may cause a casualty pain or distress but should not be taken off after being applied.

Types of External Wounds:

1. Scrapes

Management:

- Clean the wound gently with mild soap and water to remove dirt and debris.
- Apply an antiseptic solution or ointment to prevent infection.
- Cover with a clean dressing to protect from further irritation.
- Seek medical attention if signs of infection appear.

2. Laceration (cuts)

Management:

- Clean the wound with mild soap and water.
- Apply direct pressure to control bleeding using a clean cloth or sterile gauze.
- If bleeding is under control, apply an antibiotic ointment to prevent infection and cover with a sterile dressing.
- Seek medical attention if the cut is deep, gaping, or may require stitches.

3. Amputations

Partial Amputation:

- Call 911.
- Keep it in the same position.
- Cover with clean dressing and bandage and splint to support the partially detached part.

Full Amputation:

- Call 911.
- Apply direct pressure to the wound using a clean cloth, or a sterile gauze.
- If bleeding is severe and direct pressure alone is not sufficient, consider using a tourniquet.

Preserve the Amputated Part:

If the amputated part is present and safe to retrieve:

- Place the amputated part in a clean plastic bag (or the cleanest thing available).
- Place the bag in a container with ice to keep it cool, but do not allow the amputated part to directly contact ice or water.
- Label with time of day, body part, and alert EMS

.

4. Puncture wound

A sharp object puncturing the skin, such as a nail, needle, or animal bite. Creates a deep wound that can be prone to infection.

Management:

- Keep the object in place.
- Cover the object gently with sterile gauze.
- Pack around the object with gauze or cloth to stabilize it.
- Monitor for signs of infection
- Rest the injury and the casualty if possible.
- Call 911 or seek medical attention

Types of Internal Wounds:

Contusions (Bruises)

Contusions are caused by blunt force trauma that damages blood vessels underneath the skin, leading to discoloration and pain.

Most bruises are minor and heal on their own with time.

Signs and symptoms:

- Discoloration (Red, purple, blue, black)
- Pain
- Swelling
- Thirsty
- Blood in urine
- Difficulty breathing

Check for signs of infection such as increased redness, warmth, or drainage from the bruised area. Seek medical attention if these symptoms occur.

Major contusions:

The larger the bruise, the more blood loss. Swelling or deformity near organs may be a sign of more serious injuries and you must seek medical help.

Major contusions involve more significant trauma and may result in extensive bruising, pain, and potential complications.

If there is concern about a possible fracture or if the injury does not seem to be improving over time, consult a healthcare professional for further evaluation and treatment.

Bites and Stings:

Bites and stings can come from various sources, including animals, insects, and marine creatures. The bite or sting can become infected and harmful.

Bees, Wasps, and Ticks:

- Remove a stinger if present by scraping it off sideways (do not pinch or squeeze).
- To remove a tick, remove it carefully and slowly with tweezers.
- Wash the affected area with soap and water.
- Apply a cold compress or ice pack to reduce swelling and pain.
- Elevate the affected area if possible.
- Monitor for signs of allergic reaction (difficulty breathing, swelling of the face or throat) and seek immediate medical help if severe.

A tick being removed with tweezers

Lyme disease:

Between 2009 and 2023, Provincial public health units have reported 19,983 human cases of Lyme disease across Canada.

- Severe headaches
- Swelling
- Pain in muscles and bones
- Fatigue

General Considerations for Bites and Stings:

- Allergic Reactions: Monitor for signs of severe allergic reactions (anaphylaxis) such as difficulty breathing, swelling of the face or throat, and rapid onset of hives. Administer epinephrine and seek emergency medical help.
- Infection Prevention: Keep wounds clean and covered to reduce the risk of infection.
- Tetanus Protection: Ensure tetanus vaccinations are up to date, especially for animal bites and puncture wounds.

Ear, Eye and Nose Injuries

Eye Injuries

Eye injuries can vary in their nature and severity. The most common eye injuries include abrasions and foreign bodies on the front surface of the eye (the cornea).

Signs and Symptoms:

- Pain
- Redness
- Swelling
- Tearing
- Blurred vision/double vision
- Sensitivity to light

Chemical Burn:

Caused by an exposure to acids, alkalis, or other corrosive substances.

Management:

- Immediately flush the eye with water for at least 15 minutes.
- Hold the eyelids open while rinsing to ensure thorough flushing.
- Alert EMS promptly.

Foreign Object in the Eye:

Particles such as dust, dirt, sand, or small debris entering the eye.

Management:

- Do not rub the eye.
- Gently flush the eye with clean water or a saline solution using an eyecup, or by pouring water from a clean container over the eye.
- Cover the eye with a sterile eye pad or patch and seek medical attention.

Extruding Eye:

Management:

- Alert EMS immediately.
- Do not attempt to place the eye back into the socket.
- Cover the eye with moist, sterile dressings.
- Use a cup or cone with dressings over the extruding eye to secure the eye.
- Cover both eyes to minimize movement.

Eye Bleeds:

Management:

- Apply pressure to the eye socket rather than the eyeball.
- Use gauze to control bleeding.
- Cover eye with a sterile eye pad.

Blunt Trauma:

Impact to the eye from a blunt object (e.g., sports injury, fist, or projectile).

Management:

- Apply a cold compress gently to reduce swelling and pain.
- Do not apply pressure directly to the eye.
- Cover with a sterile eye pad or patch.
- Seek medical evaluation.

A black eye is often a minor injury but can still cause internal eye damage.

Penetrating or Perforating Injury:

Penetration of the eye by a sharp object (e.g., knife, shard of glass).

Management:

- Do not remove the object.
- Stabilize the object gently with a protective shield (e.g., paper cup) to prevent further movement.
- Cover both eyes with a sterile eye pad or clean cloth.
- Alert EMS immediately.

General First Aid Tips for Eye Injuries:

Do not rub the eye, as this can worsen the injury.

Avoid applying pressure directly to the eye.

Do not attempt to remove objects embedded in the eye.

Protect the eye from further injury by covering it with a sterile eye pad or patch.

Seek medical attention promptly, especially for severe injuries or if there is any concern about potential damage to vision.

Ear Injuries

Common ear injuries include foreign objects in the ear, ear canal trauma, and perforated eardrums. Ear injury treatment depends on the severity of the injury, and whether it is internal or external.

Signs and Symptoms include:

- Dizziness
- Hearing loss
- Pain
- Trauma
- Bleeding from ear

Management:

- Foreign objects like beads or cotton swabs cause pain and blockage; don't remove them yourself—seek medical help.
- Minor abrasions to the ear tissue can be cleaned and bandaged until they heal.
- More severe injuries, such as deeper cuts may require stitches, alert EMS.
- Perforated eardrums from pressure changes or trauma result in sudden pain, ringing, and fluid drainage; cover lightly and seek immediate medical attention.

Nose Injuries

Nosebleeds can be caused by blunt force, dryness, allergies, or high blood pressure.

Signs and Symptoms:

- Bleeding from one or both nostrils.
- Feeling of warmth in the nose or throat.
- Dizziness.
- Light-headedness

Management:

- Advise the casualty to sit down and lean forward slightly to prevent blood from flowing down the throat.
- Instruct the casualty to pinch the soft part of their nose (just below the bony bridge) firmly with their thumb and forefinger until bleeding stops.

Seeking Medical Attention:

Advise the person to seek medical help if:

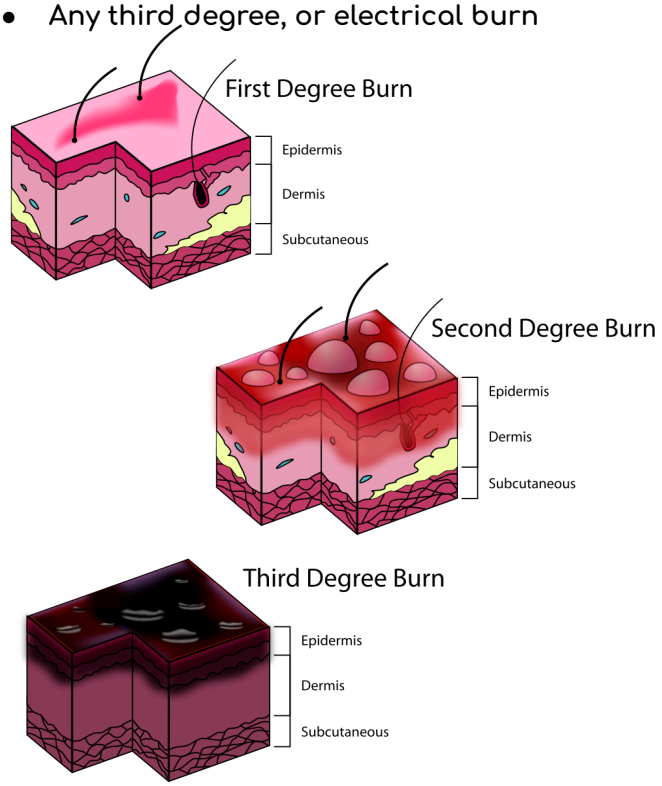
- The bleeding doesn't stop after 20-30 minutes of applying pressure.
- Nosebleed follows a head injury.
- Nosebleed occurs in a child under 2 years old.

Burn management

To determine the severity of a burn

Seek medical attention if:

- The burn is located on the head, or neck
- The burn is larger than the palm of your hand
- Any third degree, or electrical burn



Classification of burn injuries:

First-Degree Burn (Superficial Burn):

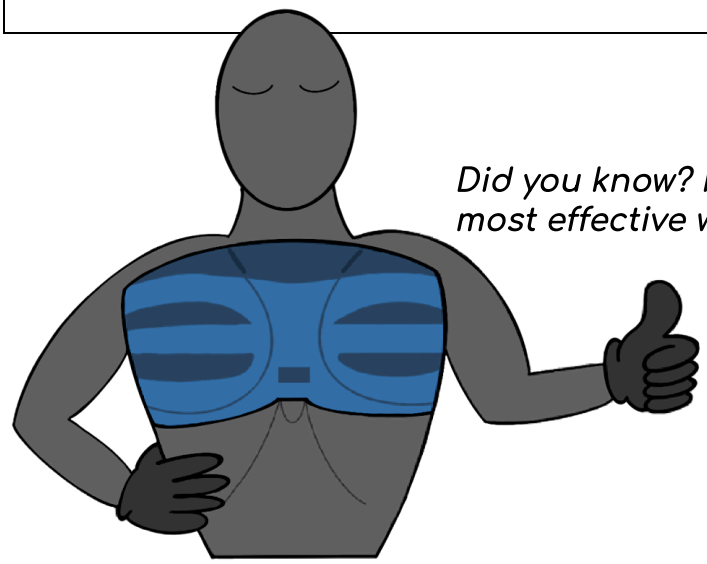
- Redness
- Mild swelling
- Pain, which can be mild to moderate
- Skin may be dry
- Generally heals within 3-6 days without scarring

Second-Degree Burn (Partial Thickness Burn):

- Red, blotchy skin
- Blisters that may be open and moist
- Severe pain
- Swelling
- Skin may appear shiny
- May take several weeks to heal and may cause scarring

Third-Degree Burn (Full Thickness Burn):

- White, charred, or leathery skin
- No pain initially (due to nerve damage)
- Visible deep tissue damage
- Dry and waxy appearance
- May appear brown or black
- Requires medical attention for healing



Did you know? Running water is the most effective way to cool a burn!

Types of Burns:

Thermal & Radiation Burns:

Thermal burns occur due to exposure to flames, hot liquids, steam, hot objects, or other sources of intense heat.

Radiation burns occur due to a sunburn, tanning beds or other ionizing radiation.

Burn management:

- Ensure the area is safe (scene and primary assessment).
- Ensure the safety of yourself and others by limiting exposure to the radiation source.
- Immediately cool the burned area with cool, running water for as long as necessary, until normal skin temperature is reached
- Remove jewelry and tight clothes.

1st degree: Cool the burned area until pain subsides

2nd degree: Cover burn loosely with a clean **non-stick dressing**

3rd degree: Cover burn loosely with a clean **non-stick dressing** and alert EMS

<u>Do not</u> apply bandage to a burn unless it is a non-stick dressing

Non-stick dressing

Chemical Burns:

These burns occur when skin or eyes come into contact with acids, alkalis, or other corrosive substances.

First aid management:

- Consult any SDS sheets for treatment
- Remove any contaminated clothing or jewelry
- Rinse the affected area with copious amounts of water for at least 20 minutes (longer for some chemicals)
- Cover the burn loosely with a clean, non-stick dressing
- Seek immediate medical assistance.

Electrical Burns:

These burns result from contact with electrical sources, such as exposed wires or lightning strikes. They can cause internal damage as well as burns on the skin.

First aid management:

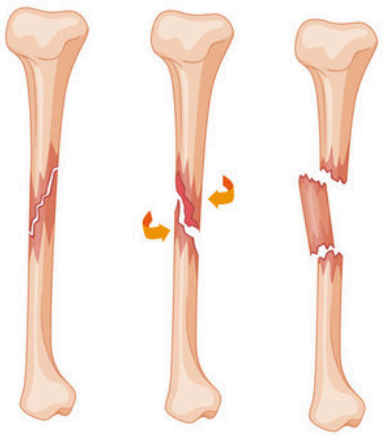
- Call 911
- Perform a scene assessment to ensure the area is safe from further electrical hazards
- Check ABCs, CPR may be necessary
- Cool the burn with cool water if it does not interfere with electrical hazards
- Cover the burn loosely with a clean non-stick dressing

Management of Musculoskeletal System Injuries

The musculoskeletal system consists of bones, muscles, joints, cartilage, tendons, ligaments, and bone marrow.

- Bones: provide structural support, protect organs, store minerals like calcium, and produce blood cells.
- Muscles: contract and relax to enable movement, with different types serving voluntary and involuntary functions.
- Joints: facilitate movement and flexibility, cushioned by cartilage and stabilized by ligaments and tendons that connect muscles to bones.
- Bone marrow: produces blood cells essential for oxygen transport and immune function.

Together, these structures and functions ensure the body's stability, movement, protection of organs, mineral storage, blood cell production, and temperature regulation.



Fractures:

A fracture is a break or crack in a bone, often caused by trauma, overuse, or underlying medical conditions. Fractures can vary in severity from a hairline crack to a complete break where bone fragments may be displaced.

Signs and symptoms:

- Swelling
- Pain and tenderness
- Numbness/tingling
- Loss of function/use
- Bruising

Open Fractures:

- Scene and primary assessment
- Cover the open wound with dressing to keep the wound as clean as possible and control bleeding
- Immobilize the injury, padding both sides of the bone to provide support, use splinting material if needed.
- If splint is applied, check for signs of poor circulation (colour, numbness, tingling.
- Call 911
- Treat for shock and ongoing care

Closed fractures:

- Scene and primary assessment
- Apply an ice pack wrapped in a cloth to the injured area.
- Elevate the injured limb if possible. Allow casualty to tell you what position is most comfortable.
- Call 911
- Treat for shock and ongoing care

Remember, as a first aider, your role is to stabilize the injury and provide initial care until professional medical help arrives. Do not attempt to straighten or realign a suspected fracture, as this could cause further damage.

Dislocations:

A dislocation occurs when the bones at a joint are forced out of their normal positions, often due to trauma or extreme stress.

It typically results in:

- Severe pain
- Swelling
- Inability to move the affected joint
- Stiffness
- Deformity

Common locations for dislocations include the shoulder, fingers, elbows, and knees.

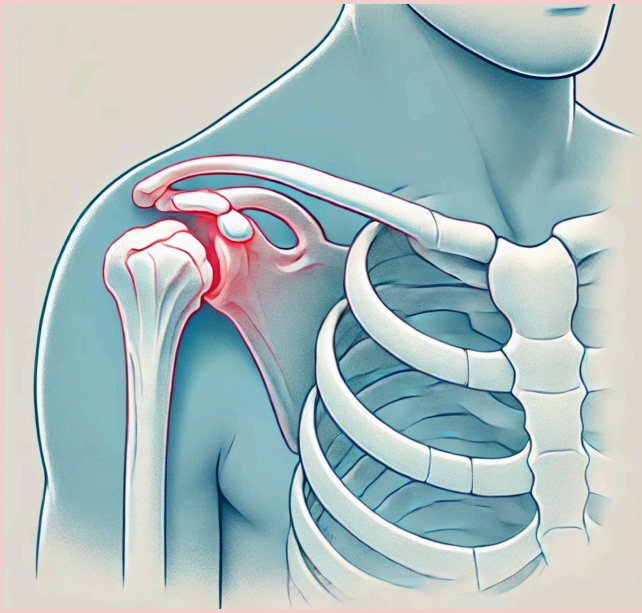
Management:

Rest - Make the casualty comfortable and relaxed.

Immobilize - Immobilize the affected joint using a splint or sling.

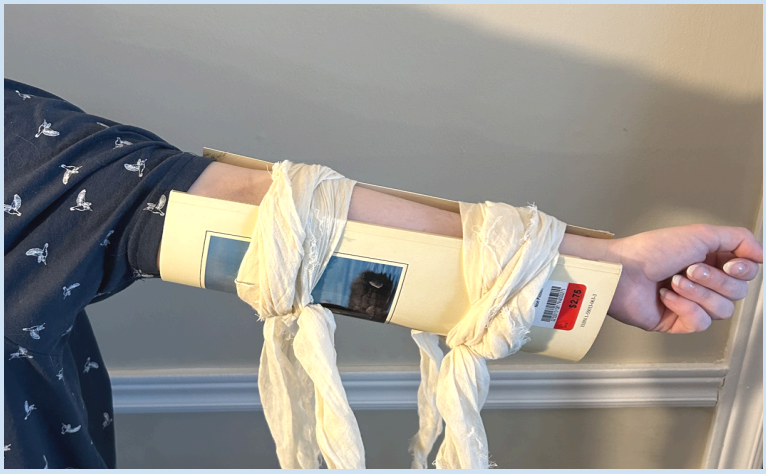
Cold Compress - Apply a cold compress or ice pack wrapped in a cloth to the injured area to reduce swelling and alleviate pain. 15-20 minutes on and 15-20 minutes off.

Elevate - Elevate the injured area if possible.



Splints:

Splinting as a first aider involves immobilizing an injured limb or joint using improvised materials to prevent further damage and reduce pain.
Splints can be made from wood, plastic, a pole, tree branches, rolled up magazines or blankets, etc.
A splint should be long enough to support the first joint above the injury and the first joint below the injury.



Management:

- Secure the splint firmly but not too tightly. Use bandages, strips of cloth, or adhesive tape to hold the splint in place.
- Apply the bandages above and below the fracture/injury, avoid covering joints directly with bandaging.
- Always splint the area most comfortable to the casualty, considering circulation and elevation.
- Monitor vitals and treat for shock.

Splint an injury only if it can be done without causing the casualty any more discomfort or pain, or if transportation is necessary.

Arm sling step 1

Arm sling step 2

Shoulder sling step 1

Shoulder sling step 2

Dislocated shoulder alternate method

MEDICAL EMERGENCIES

It's a real life situation:

In a major Canadian City, five elementary students were rushed to the hospital after consuming edibles.

"The principal of the school said police discovered that a student had brought packages of labelled cannabis edibles to the school and shared them with four other students."

Recently the IWK's poison center has seen a spike in substance abuse in children consuming cannabis edibles.

Learning Objectives

- The management of poisons and how they enter the body.
- Management of anaphylaxis, diabetic, seizure, stroke and mental health emergencies
- Knowing the signs and symptoms for environmental injury and illness

CSA Standards

L.8 Medical Emergencies
L.8.1 Poison management
L.8.2 Anaphylaxis emergencies
L.8.3 Diabetic Emergencies
L.8.4 Seizure Emergencies
L.8.5 Stroke Emergencies
L.8.6 Mental Health emergencies
L.8.8 Environmental injury and illness

POISON MANAGEMENT

Prevention:

- Safe storage of chemicals
- Use protective gear (PPE)
- Dispose of food believed to be contaminated
- Ensure proper handling of medications.
- Read labels correctly

Routes of poisons entrance into the body:

Ingestion:

Poisons are swallowed and absorbed through the digestive system. They can be found in contaminated food, drinks, or medications.

- Assess the scene
- Call poison control services and consult an SDS (if available)
- Avoid giving food, drink, or medications to the casualty
- Only induce vomiting if told by poison control
- Call 911 if advised by poison control
- Monitor vital signs
- Ongoing care

Signs and symptoms:

- Nausea and vomiting
- Abdominal pain
- Diarrhea
- Foaming at mouth
- Dizziness or weakness
- Stains/burns around casualties mouth

Inhalation:

Some poisons are gases or fine particles that can be inhaled into the lungs. Examples include carbon monoxide from car exhaust or pesticides during spraying.

- Assess the scene
- Remove the casualty from the exposure
- Call poison control
- Call 911 if advised by poison control
- Monitor vital signs
- Ongoing care

Signs and symptoms:

- Coughing or wheezing
- Chest pain
- Dizziness or lightheadedness
- Nausea or vomiting
- Change in LOC

Injection:

Injected poisons enter the body directly through the bloodstream. This can occur through drug use with contaminated needles or bites from venomous animals.

- Assess the scene
- Call poison control
- Call 911 if advised by poison control
- If a bite is on the casualties limb, tie a bandage above the bite, but not on the joint.
- Do not attempt to remove poison and keep poison below the heart.
- Monitor vitals
- Ongoing care.

Signs and symptoms:

- Noticeable bite or sting
- Difficulty breathing
- Muscle cramps
- Swelling
- Weakness or confusion
- Numbness
- Headaches/ dizziness

Absorption:

Poisons can be absorbed through the skin or mucous membranes. This route is common with chemicals like pesticides, toxic plants, or certain drugs.

- Assess the scene
- Call poison control
- Flush the affected area with water
- Monitor vital signs
- Ongoing care

Signs and Symptoms:

- Skin irritation or burns
- Itching
- Confusion
- Irritation of the eyes

IF THE CASUALTY IS UNRESPONSIVE, ACTIVATE EMS (911) IMMEDIATELY

IF THE PERSON IS AWAKE AND ALERT, CONTACT THE APPROPRIATE POISON CONTROL CENTRE

1-844-POISON-X
(1-844-764-7669)

TOLL FREE ACROSS CANADA (EXCLUDING QUEBEC & NUNAVUT)

NALOXONE

Naloxone, or Narcan, is used to reverse an opioid overdose

- Roughly twice as many Canadians die from opioid related overdoses than die from car accidents each year

In Canada, take-home naloxone kits are available in all provinces at participating pharmacies

Signs of an opioid overdose:

- Person cannot be woken up
- Gurgling or snoring sounds
- Lips and fingernails turn blue or purple
- Pupils are small or eyes are rolled back

ANAPHYLAXIS EMERGENCIES

Anaphylaxis:

is a severe (potentially life-threatening) allergic reaction that can occur quickly after exposure to an allergen.

Management:

- Look for a medic alert bracelet or necklace on the casualty
- Locate the casualties epi pen and inject the epinephrine immediately into a large muscle (the thigh is the preferred location)
- Administer another dose if necessary, as soon as the casualties symptoms return
- Alert EMS
- Keep the person comfortable
- Treat for shock and monitor casualty

Epinephrine (Epi pens):

Epinephrine, commonly known as adrenaline, is a medication used to treat severe allergic reactions (anaphylaxis). It works by rapidly counteracting the symptoms of anaphylaxis.

When administered, epinephrine:

- Relieves airway constriction
- Reduces swelling
- Boosts blood pressure
- Counters allergic reactions

Signs and symptoms:

- Hives, itching, swelling, or redness
- Difficulty breathing
- Throat swelling
- Signs of shock
- Nausea

DIABETIC EMERGENCIES

Diabetes is a medical condition characterised by elevated levels of blood glucose (sugar) due to either insufficient insulin production or the body's inability to effectively use the insulin it produces. There are two main types of diabetes, both types can experience hypoglycemia or hyperglycemia

Type 1:

The body's immune system destroys insulin-producing cells in the pancreas.

Type 2:

The body becomes resistant to insulin or the pancreas doesn't produce enough insulin.

Signs and Symptoms:

Hypoglycemia:

Reaction is sudden, often within minutes.

Occurs due to too much insulin in the body and insufficient blood sugar levels.

- Extreme hunger
- Fatigue
- Blurred vision
- Nausea and vomiting
- Diminished level of consciousness

Hyperglycemia:

Reaction is gradual, over a period of days (Generally not a first aid situation)

Insufficient insulin, too much sugar.

- Unusual thirst and frequent urination
- Frequent or recurring infections
- Cuts and bruises that are slow to heal

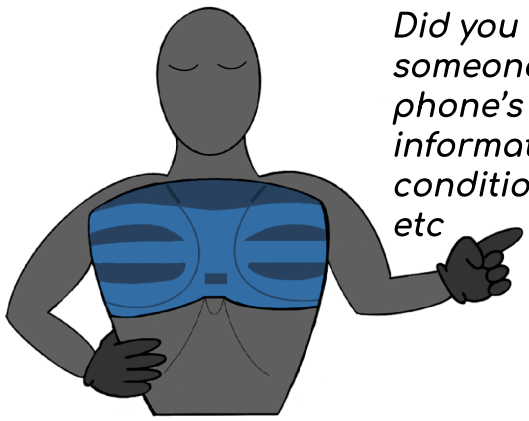
Management:

- Check for medical alert bracelet or necklace
- Administer glucose: give a fast-acting sugar such as glucose tablets, a sugary drink, or candy
- If possible, assist the casualty
- If symptoms persist or worsen, call EMS

Management:

- Have casualty consult medical assistance
- If Level of Consciousness is diminished, call EMS

Nasal glucagon (BAQSIMI)



Did you know? You can access someone's medical ID from their phone's lockscreen. Here you can find information such as allergies, medical conditions, medications, blood type, etc

SEIZURES

A seizure is a sudden, uncontrolled electrical disturbance in the brain that can cause changes in behavior, movement, sensation, or consciousness. Seizures can vary in severity and duration and may result from a wide range of causes, including neurological disorders, head injury, infections, or other medical conditions.

CAUSES:

- Neurological disorders such as epilepsy, strokes or brain injuries
- Poisoning
- Diabetes (low sugar)
- Drug/alcohol overdose
- Stress
- High Fever

TYPES OF SEIZURES:

Convulsive Seizures:

Seizures characterized by visible muscle contractions or movements.

Signs and symptoms:

- Casualty becomes rigid
- Frothing at mouth
- Loss of bladder control
- Level of consciousness change

Management:

- Clear the area of potential hazards
- Protect the casualties head with something soft, like a pillow, or your hands
- Do not hold the person down or try to restrain their movements
- Do not place objects or fingers in the person's mouth
- Ongoing care and treat for shock
- Call 911
- If the casualty has a known history of seizures, or epilepsy, a caretaker of theirs may decide not to call 911

Non-Convulsive Seizures:

Seizures without visible muscle contractions or movements, often affecting consciousness or awareness.

Signs and symptoms:

- Non-responsive
- Blinking
- Daydreaming
- Drooling
- Trembling

Management:

- Remain calm
- Ensure casualties safety
- Alert EMS if the casualty has a new onset of seizures, if seizures are frequent, or if there's a change in their usual pattern.

STROKE

A stroke is a medical emergency that occurs when there is an interruption of blood supply to the brain

Types of Strokes:

- Ischemic Stroke
- Hemorrhagic Stroke
- Transient Ischemic Attack

Signs of a stroke:

- Numbness in face
- One arm drifts down
- Slurring speech
- Time is critical

Ischemic Stroke:

- Occurs when a blood clot blocks a blood vessel supplying blood to the brain.

Hemorrhagic Stroke:

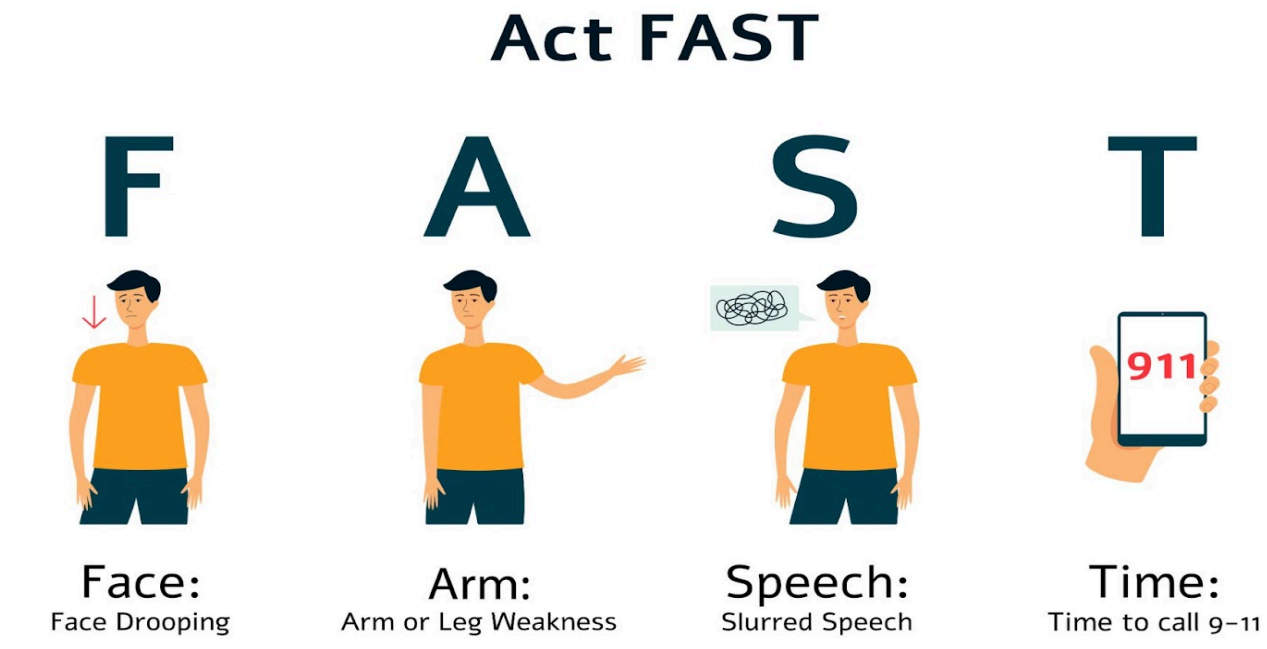
- Occurs when a blood vessel in the brain bursts, leading to bleeding (hemorrhage) in or around the brain.

Transient Ischemic Attack:

- Often called a "mini-stroke," it is a temporary blockage of blood flow to the brain that resolves on its own within minutes to hours. It serves as a warning sign of a potential future stroke.

Management:

- Assess the scene
- Recognise the signs and symptoms of a stroke, using FAST, and alert EMS
- Keep casualty comfortable and prevent further injury



MENTAL HEALTH EMERGENCIES

Types of Mental Health Emergencies:

- Suicide
- Panic attacks
- Severe anxiety
- Psychotic episodes
- Self-Harm
- PTSD

Management of Mental Health Emergencies:

First aid will vary with each mental health emergency and can even change during the event depending on the person.

General care as a first aider includes:

- Make sure you are safe and maintain a supportive presence
- Assess risk: Determine if there's immediate danger
- Seek help: Contact emergency services or mental health professionals if needed
- Support: Help the person access appropriate resources

As a first aider, communication and keeping your intentions clear to the casualty can help calm a casualty with a mental health emergency. Acknowledging the casualty directly and responding to them calmly can help you find out what's wrong and how to help.

Across Canada, the mental health Referral number is 988, it connects you to a trained responder who is ready to listen without judgement. You can call or text this number.

Recognising a Mental Health Emergency:

Common signs that people show their distress in reaction to a crisis include:

- Excessive worry
- Delusions
- Hallucinations
- Extreme mood changes
- Talks about harming themselves
- Aggressive behavior
- Visible injuries or frequently hiding wounds

Occupational Stress Injury:

Difficulty caused by traumatic experiences or prolonged high stress or fatigue during service as a first aider.

This can be caused by:

- A poor work-life balance
- New to a country
- Work overload
- Grief
- Occupational burnout

To manage this, **self care management is important:**

- Maintain a healthy diet
- Exercise
- Get sufficient sleep
- Take time for yourself
- Take your medication, if applicable

ENVIRONMENTAL EMERGENCIES

Harm or health conditions caused by exposure to environmental factors. Environmental injuries and illness most commonly result from extreme hot or cold conditions. For instance extreme heat; resulting in sunburn, heat stroke or exhaustion. As well as extreme cold: resulting in frostbite, hypothermia or immersion.

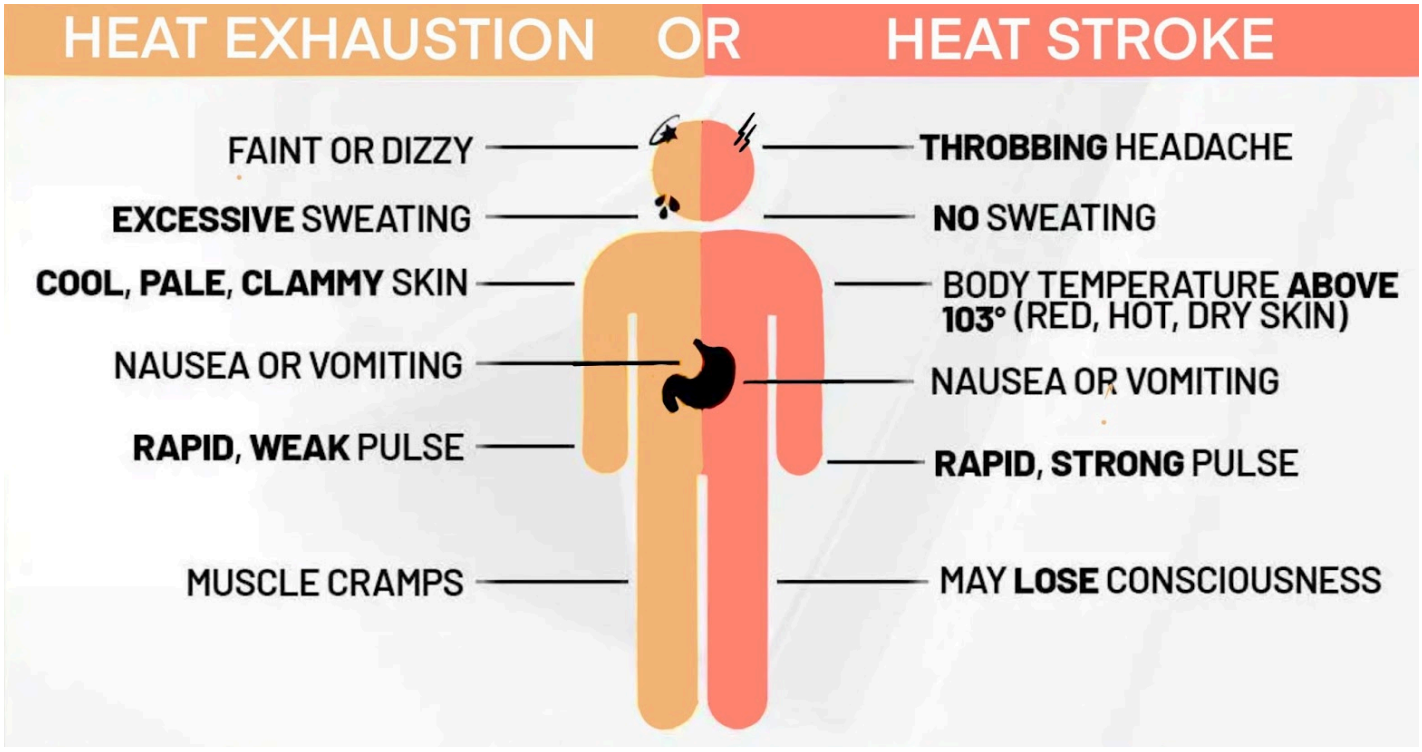
Environmental Heat Emergencies:

Heat Exhaustion:

A condition resulting from prolonged exposure to high temperatures, causing symptoms like heavy sweating, weakness, dizziness, and nausea.
It's a milder form of heat-related illness but can progress to heat stroke if not addressed.

Heat Stroke:

A severe and potentially life-threatening condition where the body's core temperature rises above 39.4°C, leading to symptoms like hot, dry skin, confusion, rapid pulse, and loss of consciousness.
Immediate medical attention is crucial.



Environmental Cold Emergencies:

Frostbite:

In cold environments, the body loses heat more quickly than it can produce it. Frostbite happens when the skin tissues freezes, causing tissue damage.

Signs and symptoms:

- Skin that appears white, gray, or bluish and feels hard or waxy
- Numbness, tingling or itching in affected area
- Blisters in severe cases
- Pain or burning sensation as rewarming begins

Common Areas affected:

- Fingers
- Toes
- Ears
- Nose

Hypothermia:

Hypothermia occurs when the body loses heat faster than it can generate it. The most common causes are prolonged exposure to cold weather or cold water.

When rewarming a casualty, avoid rewarming the limbs directly and apply heat to the trunk of the body.

Signs and Symptoms:

- Shivering (which may stop as hypothermia worsens)
- Confusion or disorientation
- Fatigue and drowsiness
- Loss of coordination
- Weak or irregular pulse
- Cold and pale skin
- Slurred speech

Trench foot:

Trench foot develops when feet remain wet for extended periods.
It causes pain, swelling, and a heavy feeling in the feet.
To protect your feet, keep them clean and dry, wear fresh, dry socks.

Signs and Symptoms:

- Red, blue, or purple skin
- Swelling and blisters on the feet
- Numbness or tingling
- Skin may feel soft or soggy
- Itching or burning sensation
- Pain in the affected feet
- In severe cases, tissue damage can occur

TRANSPORTATION MANAGEMENT

It's a real life situation:

A 67 year old woman was injured, her neighbour said there was no question they had to rush to the hospital. He said "I'd help save anybody's life, which I've been doing all my life. I was in the fire department for 20 years and 25 in search and rescue now. It's what I do".

Learning objectives

- Understanding the care and criteria for transporting ill/injured workers
- Understanding Triage for management of ill/injured workers

CSA standards

L.9 Transportation Management
L.9.1 Transportation
L.9.2 Multiple injured/ill worker incidents and transportation

TRANSPORTATION

Transportation of an ill/injured worker:

Under occupational health and safety regulations, the employer is responsible for arranging transportation to medical assistance for an employee who is injured or ill. This includes transporting the employee to a medical clinic, healthcare practitioner, or hospital as needed.

Triage:

Triage is the process of prioritizing treatment for multiple injured people based on the severity of their conditions, in the case where there are more casualties than rescuers involved, to ensure those with the most critical injuries receive attention first.

Criteria and Care during transportation:

Considerations for Transportation:

- Assess if the casualty requires medical care for illness or injury
- The location of the casualty
- Evaluate the distance to the nearest hospital
- Decide between land or air transportation based on urgency

Care During Transportation:

- Continuously check the casualty's ABCs
- Regularly monitor vital signs
- Review and adjust bandages, splints, and other treatments as needed

PRIORITY I → **IMMEDIATE**

- Airway and breathing difficulties
- Uncontrolled or severe bleeding
- Casualty would die without immediate first aid

PRIORITY II → **URGENT**

- Spinal injuries
- No airway or breathing problems
- Major or minor extremities

PRIORITY III → **MINOR**

- Walking wounded
- Minor extremities
- Minor soft tissues injuries

PRIORITY 0 → **DECEASED**

- Deceased
- Pulseless and not breathing

SPINAL AND NEUROLOGICAL EMERGENCIES

It's a real life situation:

In Canada, over 86,000 people live with Spinal Cord Injury.

Spinal Injuries that are sustained as a result of trauma such as serious vehicle crashes or falls have an estimated average lifetime cost of $2 million per individual.

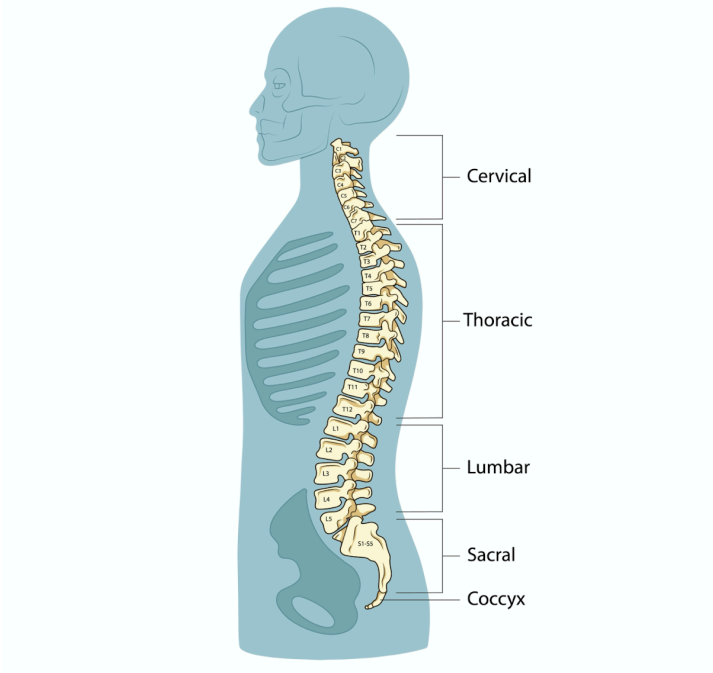
Learning objectives

- Know the signs and symptoms of a spinal column injury
- The skill to manage spinal column injuries
- Know the indications of a spinal column injury
- Management of suspected fractures

CSA standards

L.10 Spinal and Neurological Emergencies
L.10.1 Spinal and Neurological Emergencies

SPINAL AND NEUROLOGICAL EMERGENCIES



Management:

1. Keep the casualty as still as possible to prevent further injury. However, if the casualty is face down and not breathing, turn them over and begin CPR
2. Assess the scene and ensure your own safety
3. Determine the mechanism of injury, and activate EMS
4. Support the Head and Neck: Use available materials, such as rolled-up clothing or blankets, to stabilize the head and neck
5. If there are other injuries, such as bleeding, manage these without moving the casualty more than necessary
6. Vital Signs: Continuously monitor the casualty's breathing, pulse, and level of consciousness

Indications for spinal precautions:

Spinal precautions should be taken in situations where there is a risk of spinal injury. Indications for spinal precautions include incidents where the casualty has experienced:

- A high-impact incident such as a car accident, fall from a height, or a sports injury.
- When there is direct trauma to the spine, such as a blow or fall onto the back or neck.
- Severe pain or tenderness in the neck, back, or pelvis.

Spinal column injuries:

First aiders should assume all head injuries are serious and should be evaluated.

Signs and symptoms:

- Pain in the neck, back, or pelvis
- Tenderness when touching or moving the area
- Pins and needles sensation in limbs or torso
- Difficulty moving limbs or a noticeable loss of muscle strength
- Unusual body position
- Breathing problems if the injury affects the upper spinal cord
- Loss of control over bowel or bladder functions, after impact to head, neck or spine
- Discharge of blood or fluid from ears or nose
- Loss of feeling in parts of the body, such as the arms, legs, or torso

Properly recognizing and managing a potential spinal injury is critical to prevent further harm and ensure the casualty receives appropriate medical care.

Suspected fractures of the spinal column:

Management:

Managing suspected fractures to the spinal column requires careful handling to avoid further injury.

- Asses the scene
- Alert EMS immediately
- Avoid moving the casualty unless absolutely necessary for their safety (e.g., if they are in immediate danger)
- Immobilize the head and neck
- If necessary, support the head: Approach the casualty from the top of their head, lie on your stomach, carefully grab onto the casualties trapezius, while simultaneously squeezing their head between your forearms. Hold as still as possible until EMS arrives
- Never attempt to realign a suspected spinal fracture. Improper handling can worsen the injury
- Continuously monitor the casualty's breathing, pulse, and level of consciousness
- Ongoing care

Spinal immobilization

Notes