



NATIONAL OPEN UNIVERSITY OF NIGERIA

FACULTY OF HEALTH SCIENCES

COURSE CODE: EHS512

COURSE TITLE: EMERGENCY MEDICAL CARE

COURSE GUIDE

EHS 512 EMERGENCY MEDICAL CARE

Course Team Dr. A. A. Madara (Course Developer/Writer) -
University of Abuja
Dr. Usman N. Gimba (Course Editor)
IBB University Lapai
Professor Grace C. Okoli-Nnabuenyi (Course
Coordinator) - NOUN
Professor Grace C. Okoli-Nnabuenyi -(Programme
Coordinator)



NATIONAL OPEN UNIVERSITY OF NIGERIA

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National Open University of Nigeria
Headquarters
University Village
Plot 91, Cadastral Zone
Nnamdi Azikiwe Expressway
Jabi, Abuja.

Lagos Office
14/16 Ahmadu Bello Way
Victoria Island
Lagos.

e-mail: centralinfo@nou.edu.ng
URL: www.nou.edu.ng

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Printed: 2018, 2019

ISBN:

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INTRODUCTION

EHS 512 titled “Emergency Medical care” is a two (2) Units course with four (4) Modules and Fourteen (14) Units. Emergency Medical care is concerned with issues related to the three levels of first aid training: first aider, emergency first aid at work and appointed person. If you have not received training in any of the levels, you should not attempt any form of first aid, but must seek help immediately. Without specialist first-aid training, you should not attempt first aid as you could make the injury or condition worse. For example, moving someone into the recovery position could make a neck or spinal injury worse.

- remain calm and send for help by shouting, phoning or finding someone
- observe the individual, listen to what they are saying, try to find out what happened and reassure them, but do not move them unless it is absolutely necessary for safety
- stay with the injured or sick individual until help arrives, observing and noting changes in condition, as you will need to tell relevant medical staff or others what you have seen
- do as little as you need to do in order to keep the casualty stable and alive until qualified help arrives.
- complete a full written report and follow the agreed ways of working to inform managers, carers or family members who need to know.

You never know when an emergency could strike—and you might be called upon to deliver emergency care to someone in need. Especially if you’re a parent or in charge of the health and safety of children or adults—but even if you aren’t—it’s essential to be prepared, and your preparation could mean the difference between life and death for an injured person. Here are a few first aid skills that everyone should know.

WHAT YOU WILL LEARN IN THIS COURSE

In this course, you have the course units and a course guide. The course guide will tell you what the course is all about. It is general overview of the course materials you will be using and how to use those materials. It also helps you to allocate the appropriate time to each unit so that you can successfully complete the course within the stipulated time limit.

The course guide also helps you to know how to go about your Tutor-Marked Assignment which will form part of your overall assessment at the end of the course. Also, there will be regular tutorial classes that are related to this course, where you can interact with your facilitator and other students. Please, I encourage you to attend these tutorial classes.

COURSE AIMS

The course aims to give you an understanding on the concept of Emergency Medical Care.

COURSE OBJECTIVE

To achieve the aim set above, there are objectives. Each unit has a set of objectives presented at the beginning of the unit. These objectives will guide you on what to concentrate / focus on while studying the unit. Please read the objective before studying the unit and during your study to check your progress. The Comprehensive Objectives of the Course are given below.

By the end of the course/after going through this course, you should be able to:

- Define the term concept of Emergency Medical Care.

WORKING THROUGH THIS COURSE

To successfully complete this course, you are required to read each study unit, read the textbooks materials provided by the National Open University.

Reading the referenced materials can also be of great assistance.

Each unit has self-assessment exercises which you are advised to do and at certain periods during the course you will be required to submit your assignment for the purpose of assessment.

There will be a final examination at the end of the course. The course should take you about 17 weeks to complete.

This course guide will provide you with all the components of the course how to go about studying and hour you should allocate your time to each unit so as to finish on time and successfully.

THE COURSE MATERIALS

The main components of the course are:

- The Study Guide
- Study Units
- Reference / Further Readings
- Assignments
- Presentation Schedule

STUDY UNIT

The study units in this course are given below:

MODULE 1

- Unit 1 Basic skills for first aid
- Unit 2 Using an Automatic External Defibrillator (AED)
- Unit 3 Safety measures for sudden illnesses and injuries in the home
- Unit 4 Playground

MODULE 2

- Unit 1 Workplace and public places
- Unit 2 Additional support and information about health and safety
- Unit 3 Medication and healthcare activities and tasks

MODULE 3

- Unit 1 Management of emergency condition due to falls
- Unit 2 Cuts
- Unit 3 Drowning

MODULE 4

- Unit 1 Skills in cardiopulmonary resuscitation
- Unit 2 Mouth –to-mouth resuscitation
- Unit 3 Chest compressions
- Unit 4 Defibrillation

There are activities related to the lecture in each unit which will help your progress and comprehension of the unit. You are required to work on these exercises which together with the TMAs will enable you to achieve the objectives of each unit.

PRESENTATION SCHEDULE

There is a time-table prepared for the early and timely completion and submissions of your TMAs as well as attending the tutorial classes. You are required to submit all your assignments by the stipulated time and date. Avoid falling behind the schedule time.

ASSESSMENT

There are three aspects to the assessment of this course:

- i. The first one is the self-assessment exercises. The second is the

tutor marked assignments and the third is the written examination or the examination to be taken at the end of the course.

- ii. Do the exercises or activities in the unit by applying the information and knowledge you acquired during the course. The tutor-marked assignments must be submitted to your facilitator for formal assessment in accordance with the deadlines stated in the presentation schedule and the assignment file.

The work submitted to your tutor for assessment will count for 30% of your total course work.

At the end of this course, you have to sit for a final or end of course examination of about a three hour duration which will count for 70% of your total course mark.

TUTOR-MARKED ASSIGNMENT

This is the continuous assessment component of this course and it accounts for 30% of the total score. You will be given four (3) TMAs by your facilitator to answer. Three of which must be answered before you are allowed to sit for the end of course examination.

These answered assignments are to be returned to your facilitator. You're expected to complete the assignments by using the information and material in your readings references and study units.

Reading and researching into you references will give you a wider view and give you a deeper understanding of the subject.

1. Make sure that each assignment reaches your facilitator on or before the deadline given in the presentation schedule and assignment file. If for any reason you are not able to complete your assignment, make sure you contact your facilitator before the assignment is due to discuss the possibility of an extension. Request for extension will not be granted after the due date unless there in exceptional circumstances.
2. Make sure you revise the whole course content before sitting or the examination. The self-assessment activities and TMAs will be useful for this purposes and if you have any comment please do before the examination. The end of course examination covers information from all parts of the course.

COURSE MARKING SCHEME

Assignment	Marks
Assignments 1 – 3	Three assignments, best three marks of the Three count at 10% each–30% of course marks.
End of course examination	70% of overall course marks
Total	100% of course materials.

FACILITATORS/TUTORS AND TUTORIALS

Sixteen (16) hours are provided for tutorials for this course. You will be notified of the dates, times and location for these tutorial classes.

As soon as you are allocated a tutorial group, the name and phone number of your facilitator will be given to you.

These are the duties of your facilitator: He or she will mark and comment on your assignment. He will monitor your progress and provide any necessary assistance you need. He or she will mark your TMAs and return to you as soon as possible.

(You are expected to mail your tutored assignment to your facilitator at least two days before the schedule date).

Do not delay to contact your facilitator by telephone or e-mail for necessary assistance if you do not understand any part of the study in the course material. You have difficulty with the self assessment activities. You have a problem or question with an assignment or with the grading of the assignment.

It is important and necessary you acted the tutorial classes because this is the only chance to have face to face content with your facilitator and to ask questions which will be answered instantly. It is also period where you can say any problem encountered in the course of your study.

SUMMARY

You never know when an emergency could strike—and you might be called upon to deliver emergency care to someone in need. Especially if you're a parent or in charge of the health and safety of children or adults—but even if you aren't—it's essential to be prepared, and your preparation could mean the difference between life and death for an injured person.

Explain the concept of Emergency Medical Care

The list of questions expected to be answered is not limited to the above list. Finally, you are expected to apply the knowledge you have acquired during this course to your practical life.

I wish you success in this course.

**MAIN
COURSE**

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MODULE 1

Unit 1	Basic skills for first aid
Unit 2	Using an Automatic External Defibrillator (AED)
Unit 3	Safety measures for sudden illnesses and injuries in the home
Unit 4	Playground

UNIT 1 BASIC SKILLS FOR FIRST AID

1.0	Introduction
2.0	Objectives
3.0	Main content
3.1	Basic skills for first aid
3.2	Stopping heavy bleeding
3.3	The Heimlich maneuver
4.0	Conclusion
5.0	Summary
6.0	Tutor-marked Assignment
7.0	References/Further Reading

1.0 INTRODUCTION

Without specialist first-aid training, you should not attempt first aid as you could make the injury or condition worse. For example, moving someone into the recovery position could make a neck or spinal injury worse.

2.0 OBJECTIVES

At the end of this unit, the student will get to know the basic skills for first aid.

3.0 MAIN CONTENT

3.1 Basic Skills for First Aid

There are three levels of first aid training: first aider, emergency first aid at work and appointed person. If you have not received training in any of the levels, you should not attempt any form of first aid, but must seek help immediately. Without specialist first-aid training, you should not attempt first aid as you could make the injury or condition worse. For example, moving someone into the recovery position could make a neck or spinal injury worse.

- remain calm and send for help by shouting, phoning or finding someone
- observe the individual, listen to what they are saying, try to find out what happened and reassure them, but do not move them unless it is absolutely necessary for safety
- stay with the injured or sick individual until help arrives, observing and noting changes in condition, as you will need to tell relevant medical staff or others what you have seen
- do as little as you need to do in order to keep the casualty stable and alive until qualified help arrives.
- complete a full written report and follow the agreed ways of working to inform managers, careers or family members who need to know.

You never know when an emergency could strike—and you might be called upon to deliver emergency care to someone in need. Especially if you're a parent or in charge of the health and safety of children or adults—but even if you aren't—it's essential to be prepared, and your preparation could mean the difference between life and death for an injured person. Here are a few first aid skills that everyone should know.

3.2 Stopping heavy bleeding

If someone is bleeding heavily, they will not be able to form a clot—and they could bleed out. You can stop the bleeding by putting pressure on the wound—ideally with a sterile cloth, although you can also use ripped pieces of T-shirt or anything else you have on hand. Raising the wounded limb over the heart will also help to slow down heavy bleeding.

It's important to recognize the signs of arterial bleeding, as someone with an arterial wound could bleed out and die within minutes. Arterial wounds pulsate as they bleed, and the blood is usually bright red. It is essential to put pressure on the wound right away, add cloth if the cloth you use soaks through, and do not remove the pressure for any reason until medical professionals arrive.

Nosebleeds

Nosebleeds are very common in both children and adults and can be caused by trauma to the nose or simple irritation of the mucus membranes. Do not make a nosebleed victim raise their head or lie down, as this can actually make the bleeding worse. Instead, pinch the nostrils closed for as many as ten minutes, allowing the broken vein in the nose to close.

Hands-free CPR. Nowadays, the American Heart Association doesn't mandate that everyone learn rescue breathing—all you have to do is put your hands over the victim's heart and push, to the beat of "Stayin' Alive" by the Bee Gees. It's a simple technique that could mean the difference between life and death, and the American Heart Association's statistics demonstrate this in stark terms. Consider these fact:

- Approximately 88% of all cardiac arrests happen at home—not in a hospital or healthcare facility, and nowhere near a healthcare professional.
- A large percentage of cardiac arrest victims appear perfectly healthy just before their attack.
- It takes approximately 8-12 minutes on average for an ambulance to arrive on the scene of an emergency, depending on where in the country you are.
- It takes approximately four minutes for brain death to start after a cardiac arrest—with the chance of survival going down dramatically for every minute the victim does not get care.
- Bystander CPR could increase the victim's chance of survival by as much as 300.
- Only about 32% of cardiac arrest victims get CPR from a bystander.

If you are ever in a situation where you might have to provide CPR to a cardiac arrest victim, it is statistically most likely that this will happen at home, and the person you save—or don't save—will be a loved one.

3.3 The Heimlich maneuver

Not to be confused with CPR, the Heimlich maneuver is supposed to help someone who is choking on a foreign object. First, ask the victim if they are choking; in an emergency situation, the person will usually not be able to talk. Stand behind the victim, wrap your arms around them, place a fist between the person's ribcage and belly button, and place your other hand over the fist. Deliver a quick thrust upward, and keep doing this until the foreign object is dislodged. This technique is only for adults; there is a special technique for children and infants. Knowing the Heimlich could potentially help you save someone's life as well.

4.0 CONCLUSION

Nowadays, the American Heart Association doesn't mandate that everyone learn rescue breathing—all you have to do is put your hands over the victim's heart and push, to the beat of "Stayin' Alive" by the Bee Gees. It's a simple technique that could mean the difference

between life and death, and the American Heart Association's statistics demonstrate this in stark terms.

5.0 SUMMARY

It's important to recognize the signs of arterial bleeding, as someone with an arterial wound could bleed out and die within minutes. Arterial wounds pulsate as they bleed, and the blood is usually bright red. It is essential to put pressure on the wound right away, add cloth if the cloth you use soaks through, and do not remove the pressure for any reason until medical professionals arrive.

6.0 TUTOR-MARKED ASSIGNMENT

1. List the three levels of first aid training
2. Explain how to control noise bleed

7.0 REFERENCES/FURTHER READING

Skandalakis, P. N., Lainas, P., Zoras, O., Skandalakis, J. E. and Mirilas, P. (2006). "To afford the wounded speedy assistance': Dominique Jean Larrey and Napoleon". *World Journal of Surgery*. 30 (8): 1392–9.

Barkley, K. (1978). *The ambulance: the story of emergency transportation of sick and wounded through the centuries*. New York: Exposition Press. ISBN 978-0-682-48983-6.

UNIT 2 USING AN AUTOMATIC EXTERNAL DEFIBRILLATOR (AED)

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main content
 - 3.1 Using an Automatic External Defibrillator (AED)
 - 3.2 Treating shock
 - 3.3 Hypothermia treatment
 - 3.4 Knowing the signs of a stroke
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-marked Assignment
- 7.0 References

1.0 INTRODUCTION

An AED is the pair of electric paddles that doctors use to restart hearts after a cardiac arrest. They can dramatically improve the survival rate of victims, and luckily they're easy to use if you've had the proper training. Most public places—restaurants, malls, stores, and places of business—have AED's on the premises, and most CPR training companies offer classes in using an AED.

2.0 OBJECTIVES

At the end of this unit, the student will know how to use Automatic external Defibrillator.

3.0 Main content

3.1 Using an Automatic External Defibrillator (AED)

An AED is the pair of electric paddles that doctors use to restart hearts after a cardiac arrest. They can dramatically improve the survival rate of victims, and luckily they're easy to use if you've had the proper training. Most public places—restaurants, malls, stores, and places of business—have AED's on the premises, and most CPR training companies offer classes in using an AED.

3.2 Treating shock

Shock occurs when there is not enough blood getting to the brain. A victim of shock may feel faint, dizzy, or disoriented; they may also look very pale. Shock usually happens after a serious loss of blood and fluid, or after an infection, allergic reaction, illness, or accident. To treat

shock, have the victim lie on their back with their feet elevated. Cover the person with a blanket and make sure they are warm. Do not let them drink anything, as this could result in choking; move the person on their side if they vomit or bleed from the mouth. Call a doctor immediately!

3.3 Hypothermia treatment

When a person is so cold that their core temperature drops to a dangerously low level, their muscular and brain function will be seriously impaired. Symptoms include uncontrollable shivering, bad coordination, drowsiness, or abnormally slow breathing.

First, get a hypothermia victim inside or to a warm place. Help them take off wet clothing, and wrap them in blankets. A hot drink will help their temperature rise, but be sure there is no caffeine or alcohol in the drink.

3.4 Knowing the signs of a stroke

While strokes are usually associated with older people, anyone can get a stroke at any time. A stroke is caused by a small blood clot or blockage in the delicate veins that bring blood to the brain, and when a person is suffering from stroke, every second counts. Signs of a stroke include severe headaches, dizziness and disorientation, numbness or sudden drooping on one side of the body, difficulty seeing out of one or both eyes, and difficulty walking. The symptoms may be sudden and dramatic, or subtle and gradual. To tell if a person is having a stroke, ask them to smile and note if part of their face droops; or ask them to raise their arms and note if the arms are uneven. You can enlarge the veins a small amount by giving the victim Aspirin while you wait for the ambulance. It's important to be sure the person does not have an allergy or is not on a medication that might react negatively to the Aspirin ahead of time, however.

Health emergencies can be terrifying—but if you know what to do and react quickly, you can help prevent more serious health consequences for a victim or even save a life. Know these simple techniques, and you may someday be able to provide lifesaving care to a victim of injury, illness, cardiac arrest, choking, or another emergency.

4.0 CONCLUSION

To treat shock, have the victim lie on their back with their feet elevated. Cover the person with a blanket and make sure they are warm. Do not let them drink anything, as this could result in choking; move the person

on their side if they vomit or bleed from the mouth. Call a doctor immediately!

5.0 SUMMARY

Shock occurs when there is not enough blood getting to the brain. A victim of shock may feel faint, dizzy, or disoriented; they may also look very pale. Shock usually happens after a serious loss of blood and fluid, or after an infection, allergic reaction, illness, or accident.

6.0 TUTOR-MARKED ASSIGNMENT

1. What causes shock?
2. Explain how to treat shock

7.0 REFERENCES/FURTHER READING

Nicholas, G. (2005). "Disasters and Emergency Medicine". Medgadget.com.

St John Ambulance in the Industrial Revolution". St John AmbulanceUK. Retrieved 16 June 2007.

UNIT 3 SAFETY MEASURES FOR SUDDEN ILLNESSES AND INJURIES IN THE HOME

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main content
 - 3.1 Safety measures for sudden illnesses and injuries in the home
 - 3.2 The Manual Handling Operations
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-marked Assignment
- 7.0 References

1.0 INTRODUCTION

The main reason for health and safety legislation is to protect people at home and those who are affected by home activities.

2.0 OBJECTIVE

At the end of this unit, the student will get to know the safety measures for sudden illnesses and injuries in the home

3.0 MAIN CONTENT

3.1 Safety measures for sudden illnesses and injuries in the home

The main reason for health and safety legislation is to protect people at home and those who are affected by home activities.

Legislation (that is, laws) is made so that everyone in society knows which behaviors are acceptable and which are not. Laws cover all aspects of our lives including protecting the health and safety of people at home and those affected by home activities including those who receive care and support.

Reporting of Injuries, Diseases and Dangerous Occurrences

Reporting of accidents and incidents is very important. The most serious accidents and incidents are reportable to health and safety authorities.

3.2 The Manual Handling Operations

Transporting or supporting of any load (including people) and how to carry this out safely and prevent injury.

If your role involves working in the private homes of individuals you

need to know what health and safety legislation applies there. Ask the house owner about policies that are in place to support your health, safety and wellbeing.

What all policies and procedures have in common is to tell everyone how to do something or what must be in place to make sure all people are safe.

Examples of procedures can include:

- how to store and give out medication
- how to provide personal care
- how to lift and carry loads
- what to do in the event of fire
- what to do to provide first aid
- how to handle soiled bed linen.

Policies must give clear instructions so that everyone is kept safe and no one is harmed through the work that is being carried out. You must familiarize yourself with your own workplace health and safety policy and procedures.

4.0 CONCLUSION

What all policies and procedures have in common is to tell everyone how to do something or what must be in place to make sure all people are safe.

5.0 SUMMARY

Legislation (that is, laws) is made so that everyone in society knows which behaviors are acceptable and which are not. Laws cover all aspects of our lives including protecting the health and safety of people at home and those affected by home activities including those who receive care and support.

6.0 TUTOR-MARKED ASSIGNMENT

List the procedures that must be in place to make sure all people are safe.

1. how to store and give out medication
2. how to provide personal care
3. how to lift and carry loads
4. what to do in the event of fire

5. what to do to provide first aid
6. how to handle soiled bed linen.

7.0 REFERENCES/FURTHER READING

Bledsoe, B. and Barnes, D. (2004). "Traction splint. An EMS relic?". *Jems : A Journal of Emergency Medical Services*. 29 (8): 64–9.

Kuehl, A. E. (2002). *Prehospital Systems and Medical Oversight*, 3rd edition. National Association of EMS Physicians.

UNIT 4 PLAYGROUND

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main content
 - 3.1 Playground
 - 3.2 Backyard play equipment safety tips#
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-marked Assignment
- 7.0 References

1.0 INTRODUCTION

You can prevent injuries from happening to your child while at the playground. Health Canada estimates more than 28, 000 Canadian children each year are treated at hospitals for playground related injuries.

2.0 OBJECTIVES

At the end of this unit, you will get to know how to prevent injuries from happening to your children.

3.0 MAIN CONTENT

3.1 PLAYGROUND

You can prevent injuries from happening to your child while at the playground. Health Canada estimates more than 28, 000 Canadian children each year are treated at hospitals for playground related injuries. Heading outdoors to play? Remember these important tips:

1. Apply sunscreen and insect repellent to your children before they leave the house.
2. Remove any loose clothing, such as drawstrings, scarves, and bike helmets.
3. Remind children how to play safe.
Active supervision helps reduce childhood injuries while at the playground.
 1. Adults and parents should ensure children are using age appropriate equipment.
 2. Teach basic rules of play, e.g. taking turns, staying away from moving swings and bottom of slides.

3. Stay within reach of the child/children by watching them, waiting close to them to catch any potential falls and warning them of any moving objects they may not see in time.

3.2 Backyard plays equipment safety tips:

1. Equipment is secured to the ground.
2. The play structure is stable. It doesn't wobble when being used and all bolts are tight and in place.
3. Children know to keep out of the way of moving swings and bottom of slides.
4. Children know how to take turns when playing on slides and swings.
5. There is no broken glass, metal, missing pieces, or rope tied to any of the equipment.

4.0 CONCLUSION

Active supervision helps reduce childhood injuries while at the playground.

5.0 SUMMARY

In Canada more than 28, 000 Canadian children each year are treated at hospitals for playground related injuries.

6.0 TUTOR-MARKED ASSIGNMENT

List the backyard equipment safety tips

Backyard play equipment safety tips:

1. Equipment is secured to the ground.
2. The play structure is stable. It doesn't wobble when being used and all bolts are tight and in place.
3. Children know to keep out of the way of moving swings and bottom of slides.
4. Children know how to take turns when playing on slides and swings.
5. There is no broken glass, metal, missing pieces, or rope tied to any of the equipment.

7.0 REFERENCES/FURTHER READING

"Miller-Meteor History" Archived 14 March 2007 at the Wayback Machine.

Miller-Meteor. n.d. Retrieved 23 February 2007.

Accidental Death and Disability: The Neglected Disease of Modern Society.

MODULE 2

- Unit 1 Workplace and public places
- Unit 2 Additional support and information about health and safety
- Unit 3 Medication and healthcare activities and tasks

UNIT 1 WORKPLACE AND PUBLIC PLACES

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main content
 - 3.1 Workplace
 - 3.2 Employer
 - 3.3 Others in the workplace
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-marked Assignment
- 7.0 References

1.0 INTRODUCTION

As a health or social care worker, you are responsible for taking reasonable care of yourself and others in the workplace. You need to follow the policies and procedures of your employer and not act in a way which will cause an accident or ill health to yourself or others. You will probably work with a number of individuals who all have different needs and who require different types of care and support. Any task you do whilst at work, must not put them at risk.

2.0 OBJECTIVE

At the end of this unit, the student will get to know why as a health or social care worker, you are responsible for taking reasonable care of yourself and others in the workplace.

3.0 MAIN CONTENT

3.1 Workplace

As a health or social care worker, you are responsible for taking reasonable care of yourself and others in the workplace. You need to follow the policies and procedures of your employer and not act in a way which will cause an accident or ill health to yourself or others. You will probably work with a number of individuals who all have different

needs and who require different types of care and support. Any task you do whilst at work, must not put them at risk.

An example of how you can take reasonable care of those within your workplace would be to report anything that could cause someone to trip or fall, like a frayed carpet or a wet floor, and take any action that you are asked to do.

3.2 Employer

The employer has many legal responsibilities; these are likely to be carried out by line managers. Their overall responsibility is to ensure the health, safety and welfare (or well being) of all employees. The employer must make sure that this happens by putting in place policies and procedures and ensuring there is enough time and money to put safety at the centre of all tasks. Employers must provide:

- a safe place to work
- necessary training and
- appropriate and safe work equipment.

3.3 Others in the workplace

Health and safety at work is everybody's business; that means others in the workplace have a duty too. Everyone in the workplace should avoid any actions that could harm others, act respectfully and not cause any damage to property. You should always report any known health and safety hazards that might affect others.

Special training

There are a number of activities that you must not carry out until you have received special training. Usually such training would include some practical elements and assessment by a competent trainer. These activities include:

- Use of equipment such as hoists and lifts to move people and objects safely: each piece of equipment that you will use will have instructions for safe use.
- Medication: there is legislation and guidance that controls the prescribing, dispensing, administration, storage and disposal of medicines.
- Assisting and moving: it is essential that you know about safe moving and handling so you don't hurt yourself or the individual.
- First aid: this is the immediate assistance given to someone who has been injured or taken ill before the arrival of qualified

medical assistance. If you have not been trained you should get help from a qualified first aider or call an ambulance. You should not attempt first aid without training as you could make their condition or injury worse. However, you should also know your 'basic life support' duties.

- Emergency procedures: for emergency situations such as fire, explosion, flood, building damage, etc.
- Food handling and preparation: this will help you to prepare food that is safe for individuals to eat and stop you from causing food poisoning.

Working in unsafe ways, ways that have not been agreed with the employer and without appropriate training can mean that you are putting yourself, the individuals you support and others at risk of harm.

4.0 CONCLUSION

An example of how you can take reasonable care of those within your workplace would be to report anything that could cause someone to trip or fall, like a frayed carpet or a wet floor, and take any action that you are asked to do.

5.0 SUMMARY

As a health or social care worker, you are responsible for taking reasonable care of yourself and others in the workplace. You need to follow the policies and procedures of your employer and not act in a way which will cause an accident or ill health to yourself or others. You will probably work with a number of individuals who all have different needs and who require different types of care and support.

6.0 TUTOR-MARKED ASSIGNMENT

Explain in detail the term special training.

7.0 REFERENCES/FURTHER READING

"Royal Commission on the National Health Service". Socialist Health Association. HMSO. 17 July 1979.

UNIT 2 ADDITIONAL SUPPORT AND INFORMATION ABOUT HEALTH AND SAFETY

- 1.0 Introduction
- 2.0 Objective
- 3.0 Main content
 - 3.1 Definition of term
 - 3.2 Accidents and sudden illness
 - 3.3 Risk assessment
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-marked Assignment
- 7.0 References

1.0 INTRODUCTION

There may be times when you feel you need to know more about how to prevent accidents or ill health. Your employer may already have lots of information or procedures so ask your manager if you can look at these and discuss them.

2.0 OBJECTIVE

At the end of this unit, you will get to know about the additional support and information about health and safety.

3.0 MAIN CONTENT

3.1 Definition of term

There may be times when you feel you need to know more about how to prevent accidents or ill health. Your employer may already have lots of information or procedures so ask your manager if you can look at these and discuss them.

Also, the workplace may have a designated health and safety person who can help you to find information or answer a question. Health and safety law posters (displayed in the workplace) or leaflets (provided to each individual) are other ways of gaining more knowledge. Additional support and information can be found on the Health and Safety Executive (HSE) website.

3.2 Accidents and sudden illness

Accidents are caused by the risks found in the particular workplace. Risk assessments are available which identify all the potential risks and

steps to reduce the likelihood of them happening.

Potential accidents could include:

- slips and trips
- falls
- sharps injuries (an incident in which a sharp object e.g. needle, blade, broken glass or cannula penetrates the skin)
- burns and scalds
- injuries from operating machinery or specialized equipment
- electrocution
- Accidental poisoning.

As well as injuries arising from accidents, the nature of health and social care means that individuals may have existing conditions which can cause sudden illness. You may be faced with sudden illnesses including:

- diabetic coma
- epileptic seizure
- fainting (this might also be caused by an accident)
- bleeding (after an operation, or such as a nosebleed, as well as from an accident)
- stroke
- heart attack.

If an accident or sudden illness happens you must ensure the safety of the individuals concerned and everyone else who may be affected. All workplaces will have a health and safety procedure to outline what to do in an emergency and you must ensure that you are familiar with it. You must also be familiar with the individual's care plan, for example if they are known to have a condition that could lead to sudden illness, and how you should respond.

3.3 Risk assessment

A risk assessment helps the individual to have their choices met in the safest possible ways. Risk assessments are not only a legal requirement, they also provide clear guidance and information on how to keep people safe and prevent danger, harm and accidents. They identify hazards in a workplace, evaluate the level of risk and put in place measures or procedures to reduce the risk.

There are five steps to a risk assessment which you will need to understand:

1. Identify the hazards of an area, a specific task or situation.

2. Identify those who may be harmed, such as individuals being supported, visitors, other workers and contractors.
3. Evaluate the risk by looking at what methods are in place to control risks or reduce them.
4. Record the findings of the risk assessment to help to remind everyone of what the risks are and how to reduce them.
5. Review and modify the risk assessment if and when changes happen to the tasks or workplace. Changes may increase risks or reduce them.

Reporting health and safety risks

The most important part of hazard reporting is that you act quickly and tell a manager or supervisor who can take action to prevent an accident or harm. It is a legal requirement that you do this. Once a hazard is identified, a risk assessment needs to be carried out. You should be familiar with your agreed ways of working for reporting health and safety risks.

Moving and assisting

Your role may include moving and assisting people and will certainly involve moving and handling objects. There are laws specifically about tasks that involve lifting, putting down, pushing, pulling, carrying or moving by hand or bodily force. These tasks are governed, in particular, by the last three in the list of legislation at the start of this standard in this workbook.

Some work roles require the use of assisted beds and hoists to help with moving and assisting individuals. You must have proper training before using this equipment, to ensure that you use it properly and do not injure yourself or the individual. Other tasks that require training and an assessment of competence include:

- supporting an individual to transfer from a bed to a chair
- helping with daily assisting routines like bathing
- moving on and off the toilet.

You should always carry out moving and assisting tasks in the agreed ways found in your policies and procedures and the individual's care plan.

Over a third of injuries in the workplace, which lead to time off work, are due to moving and handling. It is extremely important that specialist training on moving and handling is provided. This will prevent accidents and minimize the likelihood of injury to the individuals you support, yourself and others.

4.0 CONCLUSION

Also, the workplace may have a designated health and safety person who can help you to find information or answer a question. Health and safety law posters (displayed in the workplace) or leaflets (provided to each individual) are other ways of gaining more knowledge.

5.0 SUMMARY

Additional support and information can be found on the Health and Safety Executive (HSE) website.

6.0 TUTOR-MARKED ASSIGNMENT

List the five steps to curb risk assessment.

7.0 REFERENCES/FURTHER READING

Wulterkens, D. (2005). "EMS in the Netherlands: A Dutch Treat?". *Journal of Emergency Medical Services*.

Suserud, B. (2005). "A new profession in the pre-hospital care field: the ambulance nurse". *Nursing in Critical Care*. 10 (6): 269
71.

- **Storing:** controlled drugs (CDs) must be stored in a locked cupboard or might be kept by the individual itself-administering.
- **Administering:** ensure the right person receives the right dose of the right medication at the right time.
- **Recording:** use the medicine administration record (MAR) which charts the administration of drugs. Make sure the records are clear.
- **Transfer:** medication has to stay with the individual as it is their property, so if they are transferred the medication goes with them. ('Staying with' includes being kept in a locked cupboard if necessary.)
- **Disposal:** return unwanted medication to a pharmacy. Care homes must use a licensed waste management company.
- It may be that your role does not require you to work with medication and therefore you won't be required to undertake any specialist training. However, it is important to know what your employer's ways of working are.

Tasks like cutting or filing fingernails or toe nails, continence maintenance and assisting with medication can be carried out only if they have been written in the individual's care or support plan. That's why it is vital that the individual's needs and wishes are agreed and clearly written down as a care plan, so all workers know when and how to provide support for that particular person, as well as whether the person has the mental capacity or mobility they need to manage themselves.

You always have to obtain the individual's consent before carrying out healthcare tasks or assisting with medication.

Detailed policies and procedures about handling medication

Appropriate training must be provided for health and social care workers who are required to provide medication.

You are not allowed to remind about, assist with or give individuals their medication or carry out related healthcare tasks unless it is part of your role and until you have completed and satisfactorily passed the appropriate training. This applies to inhaled medication, any medication that needs to be swallowed, medical creams or ointments, drops, cutting or filing nails or prompting or helping with injections.

Except in emergency, you should not carry out any actions that are not covered by the individual's care plan (but remember it is always part of your job to work with your manager to help individuals change their care plan if necessary). As legislation on medication and related tasks is forever changing, you need to keep yourself up to date with current laws

and guidance from your employer.

3.2 Hazardous substances in your workplace

Hazardous substances found in a health and social care environments include:

- cleaning materials
- disinfectants
- body fluids
- medication
- clinical waste such as dressings
- contaminated clothes, towels and bed linen.

These substances can enter the body via inhalation (breathing in), ingestion (swallowing), injection (needle stick) or absorption (through the skin). For all products you use, read the hazard information found on the label; this will inform you about their hazards and help you to keep yourself and others safe.

3.3 Dealing with hazardous substances

The workplace must have a secure and specific area especially for the storage of hazardous substances.

Some hazardous substances should only be handled when the worker is wearing personal protective equipment (PPE). Your employer will have policies and procedures which set out when PPE should be worn which will normally include handling clinical waste and some chemicals.

You must always work within agreed ways to protect your own health and wellbeing as well as those around you.

Fire safety

Fires are a hazard in any workplace and can lead to injury or death.

Basic fire prevention measures include:

- No smoking or naked flames within the building.
- Do not have fire doors propped open as this will increase the speed at which a fire spreads in a building.
- Do not allow waste to accumulate which could provide fuel to a fire.
- Check escape routes are not blocked and keep them clear of furniture or boxes.
- Check that appliances and plugs are turned off to help prevent an electrical fire from starting.

If you are supporting someone in their own home these measures may not apply. You can support individuals to get advice to make their homes safer but you must respect the choices that they make; for example they may choose to smoke or not to have smoke alarms. (See also Care Certificate standards 3 and 9 on supporting independence and managing risk.)

A workplace will have their own specific procedures and actions to be taken in the event of a fire and you must make sure that you familiarize yourself with these procedures. If you work in someone's home make sure you familiarize yourself with escape routes and agree with your employer what you would do in the case of a fire. Sometimes there may be increased risks in an individual's home that you need to be aware of; they may choose to smoke for example.

3.4 Working safely and securely

In order to stop intruders and prevent individuals from becoming victims of crime, good security measures are important. Your organization will have security procedures in place, so ensure you familiarize yourself with them. Your employer may also have guidance or advice about safe working. Ask your manager about this.

Examples of security measures include:

- challenging any strangers you find on the premises or in restricted areas
- requiring visitors to secure premises to sign a visitor book
- setting alarms where they are fitted
- checking the identity of individuals who ring and ask for information.

If your workplace is small, outside doors should be locked and fitted with a door bell to ensure no unauthorized access. Never let in visitors or give out information unless you have consent to do so.

If you are working in an individual's home you can support them to get advice about how to make their home more secure, for example by accessing information on the internet.

4.0 CONCLUSION

You always have to obtain the individual's consent before carrying out healthcare tasks or assisting with medication.

5.0 SUMMARY

As legislation on medication and related tasks is forever changing, you need to keep yourself up to date with current laws and guidance from your employer.

5.0 TUTOR-MARKED ASSIGNMENT

List the procedures about handling medication.

7.0 REFERENCES/FURTHER READING

Wulterkens, D. (2005). "EMS in the Netherlands: A Dutch Treat?". *Journal of Emergency Medical Services*.

Suserud, B. (2005). "A new profession in the pre-hospital care field: the ambulance nurse". *Nursing in Critical Care*. 10 (6): 269–71.

5. Implement immediate intervention within first 24 hours.
6. Complete falls assessment.
7. Develop plan of care.
8. Monitor staff compliance and resident response.

The first five steps comprise an immediate response that occurs within the first 24 hours after a fall. Steps 6, 7, and 8 are long-term management strategies.

The purpose of this chapter is to present the FMP Fall Response process in outline form. As you review this chapter, it may be helpful to use the case study and materials presented in to illustrate the Fall Response process.

1. Evaluate and Monitor Resident for 72 Hours After the Fall

Immediate evaluation by the nurse after a resident falls should include a review of the resident systems and description of injuries. Upon evaluation, the nurse should stabilize the resident and provide immediate treatment if necessary.

Evaluation of the resident's condition before, during or immediately after the fall provides clues to possible causes. Risk factors related to medical conditions or medication use may be reflected in abnormal values for any of the following:

- Vital signs (T, P, R, BP).
- Postural blood pressure and apical heart rate.
- Finger stick glucose (for diabetics).

When indicated by the resident's condition and history, laboratory tests such as CBC, urinalysis, pulse oximetry, electrolytes and EKG should be performed.

Residents should have increased monitoring for the first 72 hours after a fall. Each shift, the nurse should record in the medical record a review of systems, noting any worsening or improvement of symptoms as well as the treatment provided. Reference to the fall should be clearly documented in the nurse's note. Go to for a sample nurse's note after a fall.

2. Investigate Fall Circumstances

If fall circumstances are not investigated at the time of the incident, it is very difficult later to piece together the event and to determine what risk factors were present. Even when a resident is found on the floor after an unwitnessed fall, direct care staff can

use their experience and knowledge of the resident to make educated guesses based on the evidence. A response of "unknown" should rarely if ever be accepted by the nurse manager during the investigation of a fall.

If staff fear negative responses from their supervisors, they will not be willing to report near misses or clues that might reflect a staff error. Nurse managers should be non-blaming and skilled in problem-solving with frontline staff.

3. Record Circumstances, Resident Outcome and Staff Response

A written full description of all external fall circumstances at the time of the incident is critical. This includes factors related to the environment, equipment and staff activity.

The Tracking Record for Improving Patient Safety (TRIPS) is the method used in the FMP to report all types of falls. (Figure 2) The Centers for Medicare and Medicaid Services' definition of a reportable fall includes the following:

1. An episode where a resident lost his/her balance and would have fallen, were it not for staff intervention, is a fall. In other words, an intercepted fall is still a fall.
2. The presence or absence of a resultant injury is not a factor in the definition of a fall. A fall without injury is still a fall.
3. When a resident is found on the floor, the facility is obligated to investigate and try to determine how he/she got there, and to put into place an intervention to prevent this from happening again. Unless there is evidence suggesting otherwise, the most logical conclusion is that a fall has occurred.
4. The distance to the next lower surface (in this case, the floor) is not a factor in determining whether a fall occurred. If a resident rolled off a bed or mattress that was close to the floor, this is a fall.

The TRIPS form is divided into two sections. Section A includes basic resident information, methods for documentation in the medical record and notification of the primary care provider and family. In section B there are questions related to 1) circumstances, 2) staff response and 3) resident and care outcomes.

The nurse manager working at the time of the fall should complete the TRIPS form. After talking with the involved direct

care staff, the nurse is asked to use his/her experience and knowledge of the resident to piece together clues so that "unknown" is used sparingly, if at all. The form should next be checked by the Falls Nurse Coordinator or director of nursing and any missing information such as emergency room visits, hospital admissions, x-ray results or additional medical tests added at a later time.

5. FAX Alert to the Primary Care Provider

When a resident falls who has already been entered into the FMP, the nurse should send a FAX Alert to the primary care provider. The purpose of this alert is to inform the physician, nurse practitioner or physician's assistant of the resident's most recent fall as well as the resident's total number of falls during the previous 180 days.

6. Implement Immediate Intervention within First 24 Hours

An immediate response should help to reduce fall risk until more comprehensive care planning occurs. Therefore, an immediate intervention should be put in place by the nurse during the same shift that the fall occurred.

When investigation of the fall circumstances is thorough, it is usually clear what immediate action is necessary. For example, if the resident falls on the way to the bathroom because of urgency and poor balance, interventions related to toileting and staff assistance would be appropriate. However, if the resident is found on the floor between the bed and the bathroom and staff do not look for clues such as urine or footwear or ask the resident questions, immediate care planning is much more difficult.

Some examples of immediate interventions are:

- Increased toileting with specified frequency of assistance from staff.
- Increased assistance targeted for specific high-risk times.
- Increased monitoring using sensor devices or alarms.
- Increased staff supervision targeted for specific high-risk times.
- Pain management.
- Protective clothing (helmets, wrist guards, hip protectors).
- Safe footwear.
- Low bed/mat.
- Specific behavior management strategies.

Documentation of the immediate response on the medical record is important. Missing documentation leaves staff open to negative consequences through survey or litigation.

7. Complete Falls Assessment

In addition to the clues discovered during immediate resident evaluation and increased monitoring, the is used for a more in-depth look at fall risk. Five areas of risk accepted in the literature as being associated with falls are included. They are:

- Medications—antidepressants, antipsychotics, benzodiazepines, sedative/hypnotics and digoxin.
- Orthostatic hypotension.
- Poor vision.
- Impaired mobility.
- Unsafe behavior.

The resident's footwear and foot care as well as environmental and equipment safety concerns should also be assessed. In the FMP, these factors are part of the Living Space Inspection.

Because the Falls Assessment will include referrals for further workup by the primary care provider or other health care professionals, contact with the appropriate persons should be made quickly. Automatic faxes are used to communicate with the resident's physician, nurse practitioner or physician's assistant. The Primary Care Provider FAX Report and Orders introduces the FMP, presents results of the resident's Falls Assessment and provides a form to fax back orders. The FAX Back Orders sheet and the Falls Assessment should be placed on the medical record once completed. A copy of this 3-page fax is in Appendix B. More information on step 6 appears.

8. Develop Plan of Care

Results of the Falls Assessment, along with any orders and recommendations, should be used by the interdisciplinary team to develop a comprehensive falls care plan within 1-7 days after the fall. The Fall Interventions Plan should be used by the Falls Nurse Coordinator as a worksheet and to record the final interventions selected for the resident. The interventions listed on this form are grouped in the same five risk areas used for the Falls Assessment.

Often the primary care plan does not include specific enough detail to effectively reduce fall risk. Safe footwear is an example of an intervention often found on a care plan. Yet to prevent falls, staff must know which of the resident's shoes are safe. This level of detail only comes with frontline staff involvement to individualize the care plan. The Fall Interventions Plan should include this level of detail.

9. Monitor Staff Compliance and Resident Response

While the falls care plan may include potentially effective interventions, it is staff compliance that will reduce fall risk. A program's success or failure can only be determined if staff actually implement the recommended interventions. Thus, monitoring staff follow-through on the unit is necessary once the care plan has been developed.

Resident response must also be monitored to determine if an intervention is successful. Changes in care and alternate interventions should be decided based on continued assessment of the resident and family input.

The Fall Interventions Monitor provides a method to document staff implementation, effectiveness of selected interventions and any necessary revisions.

Skin is the largest organ of the human body. It is soft to allow movement, but tough enough to resist breaking or tearing. It varies in texture and thickness from one part of the body to the next. It consists of two main layers – the epidermis and the dermis. The epidermis refers to the surface layer and is made of several sheets of skin cells. The dermis lies underneath and consists of elastic fibres (elastin), for suppleness, and protein fibres (collagen) for strength. Sebaceous glands, hair follicles, nerves and blood vessels are found in the dermis.

4.0 CONCLUSION

The purpose of this chapter is to present the FMP Fall Response process in outline form. As you review this chapter, it may be helpful to use the case study and materials presented in to illustrate the Fall Response process.

5.0 SUMMARY

The Fall Response is a comprehensive approach that forms the backbone of the Falls Management Program (FMP).

6.0 TUTOR-MARKED ASSIGNMENT

1. Define the term skin.
2. What is epidermis.

7.0 REFERENCES/FURTHER READING

"Fall and Injury Prevention – Patient Safety and Quality – NCBI Bookshelf". Retrieved 2015-12-15.

Panel on Dietetic Products, Nutrition and Allergies (2011). "Scientific Opinion on the substantiation of a health claim related to vitamin D and risk of falling pursuant to Article 14 of Regulation (EC) No 1924/2006"

UNIT 2 CUTS

- 1.0 Introduction
- 2.0 Objective
- 3.0 Main content
 - 3.1 Cuts
 - 3.2 Abrasions
 - 3.3 First aid treatment includes
 - 3.4 Treatment for cuts and abrasions
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

Cuts are any injury that involves bleeding or scalding, but does not cause permanent damage, is what can be defined as a minor cut or a burn. These injuries are superficial and take three to six days to heal. Apply an antibiotic such as Silver *Sulphadiazine*, use a sterile bandage to cover the burn or cut and finally take tetanus vaccination, if required.

2.0 OBJECTIVES

At the end of this unit, the student will be enlightened on the term cuts.

3.0 MAIN CONTENT

3.1 CUTS

Any injury that involves bleeding or scalding, but does not cause permanent damage, is what can be defined as a minor cut or a burn. These injuries are superficial and take three to six days to heal. Apply an antibiotic such as Silver *Sulphadiazine*, use a sterile bandage to cover the burn or cut and finally take tetanus vaccination, if required.

3.2 Abrasions

An abrasion means that the surface layers of the skin (epidermis) has been broken. Thin-skinned bony areas (like knees, ankles and elbows) are more prone to abrasions than thicker, more padded areas. The scraped skin of an abrasion can contain particles of dirt.

3.3 First aid treatment includes

- Clean the wound with a non-fibre shedding material or sterile gauze, and use an antiseptic such as Betadine. If there is embedded dirt, Savlon may be used as it contains an antiseptic and a surfactant to help remove debris. Rinse the wound after five minutes with sterile saline or flowing tap water.
- Don't scrub at embedded dirt, as this can traumatise the site even more.
- Cover the cleaned wound with an appropriate non-stick sterile dressing.
- Change the dressing according to the manufacturer's instructions (some may be left in place for several days to a week). If you reapply antiseptic, wash it off after five minutes and then redress the wound.

3.4 Treatment for cuts and abrasions

Some wounds are too large for the body to seal without help. Your doctor will decide whether or not a wound requires stitching or gluing.

General suggestions to take care of a stitched wound include:

- Keep the site dry and clean. It may be covered with an occlusive thin film dressing, which is waterproof and protective.
- Only apply lotions or ointments to the wound if instructed to do so by medical staff.
- Try not to exert yourself, as physical activity may cause the site to bleed.
- Seek medical advice immediately if the site starts to produce pus, swell or exude a disagreeable odour.

4.0 CONCLUSION

Apply an antibiotic such as Silver *Sulphadiazine*, use a sterile bandage to cover the burn or cut and finally take tetanus vaccination, if required.

5.0 SUMMARY

Cuts are any injury that involves bleeding or scalding, but does not cause permanent damage, is what can be defined as a minor cut or a burn.

6.0 TUTOR-MARKED ASSIGNMENT

1. Define the term cuts
2. Explain the term abrasion

7.0 REFERENCES/FURTHER READING

"Resource: Algorithm for Fall Risk Screening, Assessment, and Intervention" (PDF). *Centers for Disease Control and Prevention*. 2017. Archived from the original (PDF) on 2017-12-31.

Tricco and Straus, S. E. (2017). "Comparisons of Interventions for Preventing Falls in Older Adults: A Systematic Review and Meta analysis".

UNIT 3 DROWNING

- 1.0 Introduction
- 2.0 Objective
- 3.0 Main content
 - 3.1 Drowning
 - 3.2 Burns
 - 3.3 Electric shocks
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-marked Assignment
- 7.0 References

1.0 INTRODUCTION

Victims of drowning usually do not thrash in the water as often depicted on television or in the movies. Most victims are found floating or submerged in the water.

2.0 Objective

At the end of this unit, the student will get to know the danger of drowning.

3.0 MAIN CONTENT

3.1 Drowning

Drowning is a silent killer. Victims may not be able to call for help because they are expending all of their energy trying to breathe or keep their head above water. When water is inhaled, the upper airway or larynx (voice box) may go into a spasm, making it difficult to cry for help.

Victims of drowning usually do not thrash in the water as often depicted on television or in the movies. Most victims are found floating or submerged in the water.

3.2 BURNS

For serious burns, after appropriate first aid and wound assessment, your treatment may involve medications, wound dressings, therapy and surgery. The goals of treatment are to control pain, remove dead tissue, prevent infection, reduce scarring risk and regain function.

People with severe burns may require treatment at specialized burn centers. They may need skin grafts to cover large wounds. And they may need emotional support and months of follow-up care, such as physical therapy.

3.3 ELECTRIC SHOCKS

The danger from an electrical shock depends on the type of current, how high the voltage is, how the current traveled through the body, the person's overall health and how quickly the person is treated.

An electrical shock may cause burns, or it may leave no visible mark on the skin. In either case, an electrical current passing through the body can cause internal damage, cardiac arrest or other injury. Under certain circumstances, even a small amount of electricity can be fatal.

When to contact your doctor

A person who has been injured by contact with electricity should be seen by a doctor.

Caution

- Don't touch the injured person if he or she is still in contact with the electrical current.
- Call 911 or your local emergency number if the source of the burn is a high-voltage wire or lightning. Don't get near high-voltage wires until the power is turned off. Overhead power lines usually aren't insulated. Stay at least 20 feet (about 6 meters) away — farther if wires are jumping and sparking.
- Don't move a person with an electrical injury unless he or she is in immediate danger.

When to seek emergency care

Call 911 or your local emergency number if the injured person experiences:

- Severe burns
- Confusion
- Difficulty breathing
- Heart rhythm problems (arrhythmias)
- Cardiac arrest
- Muscle pain and contractions
- Seizures
- Loss of consciousness

Take these actions immediately while waiting for medical help:

- Turn off the source of electricity, if possible. If not, move the source away from you and the person, using a dry, non conducting object made of cardboard, plastic or wood.
- Begin CPR if the person shows no signs of circulation, such as breathing, coughing or movement.
- Try to prevent the injured person from becoming chilled.
- Apply a bandage. Cover any burned areas with a sterile gauze bandage, if available, or a clean cloth. Don't use a blanket or towel, because loose fibers can stick to the burns.

4.0 CONCLUSION

The danger from an electrical shock depends on the type of current, how high the voltage is, how the current traveled through the body, the person's overall health and how quickly the person is treated.

5.0 SUMMARY

A person who has been injured by contact with electricity should be seen by a doctor.

6.0 TUTOR-MARKED ASSIGNMENT

1. Define the term electric shock
2. List three measures to be taken when there is a case of electric shock.

7.0 REFERENCES/FURTHER READING

"Costs of Falls Among Older Adults" (2016). Centers for Disease Control and Prevention, Home and Recreational Safety, U.S. Department of Health & Human Services, Bethesda, MD.

MODULE 4

Unit 1	Skills in cardiopulmonary resuscitation
Unit 2	Mouth –to-mouth resuscitation
Unit 3	Chest compressions
Unit 4	Defibrillation

UNIT 1 SKILLS IN CARDIOPULMONARY RESUSCITATION

1.0	Introduction
2.0	Objectives
3.0	Main content
3.1	Skills in cardiopulmonary resuscitation
4.0	Conclusion
5.0	Summary
6.0	Tutor-marked Assignment
7.0	References/Further Reading

1.0 INTRODUCTION

The American Heart Association recommends that everyone — untrained bystanders and medical personnel alike — begin CPR with chest compressions.

It's far better to do something than to do nothing at all if you're fearful that your knowledge or abilities aren't 100 percent complete. Remember, the difference between your doing something and doing nothing could be someone's life.

2.0 OBJECTIVES

At the end of this unit, the student will get to know the skills in cardiopulmonary resuscitation.

3.0 MAIN CONTENT

3.1 Skills in Cardiopulmonary Resuscitation

Cardiopulmonary resuscitation (CPR) is a lifesaving technique useful in many emergencies, including a heart attack or near drowning, in which someone's breathing or heartbeat has stopped. The American Heart Association recommends that everyone — untrained bystanders and medical personnel alike — begin CPR with chest compressions.

It's far better to do something than to do nothing at all if you're fearful that your knowledge or abilities aren't 100 percent complete. Remember, the difference between your doing something and doing nothing could be someone's life.

Here's advice from the American Heart Association:

- **Untrained.** If you're not trained in CPR, then provide hands-only CPR. That means uninterrupted chest compressions of 100 to 120 a minute until paramedics arrive (described in more detail below). You don't need to try rescue breathing.
- **Trained and ready to go.** If you're well-trained and confident in your ability, check to see if there is a pulse and breathing. If there is no breathing or a pulse within 10 seconds, begin chest compressions. Start CPR with 30 chest compressions before giving two rescue breaths.
- **Trained but rusty.** If you've previously received CPR training but you're not confident in your abilities, then just do chest compressions at a rate of 100 to 120 a minute. (Details described below.)

The above advice applies to adults, children and infants needing CPR, but not newborns (infants up to 4 weeks old). CPR can keep oxygenated blood flowing to the brain and other vital organs until more definitive medical treatment can restore a normal heart rhythm.

When the heart stops, the lack of oxygenated blood can cause brain damage in only a few minutes. A person may die within eight to 10 minutes. To learn CPR properly, take an accredited first-aid training course, including CPR and how to use an automated external defibrillator (AED). If you are untrained and have immediate access to a phone, call 911 or your local emergency number before beginning CPR. The dispatcher can instruct you in the proper procedures until help arrives.

- Is the environment safe for the person
- Is the person conscious or unconscious
- If the person appears unconscious, tap or shake his or her shoulder and ask loudly, "Are you OK"
- If the person doesn't respond and two people are available, have one person call 911 or the local emergency number and get the AED, if one is available, and have the other person begin CPR.
- If you are alone and have immediate access to a telephone, call 911 or your local emergency number before beginning CPR. Get the AED, if one is available.

- As soon as an AED is available, deliver one shock if instructed by the device, then begin CPR.

4.0 CONCLUSION

Cardiopulmonary resuscitation (CPR) can keep oxygenated blood flowing to the brain and other vital organs until more definitive medical treatment can restore a normal heart rhythm.

5.0 SUMMARY

To learn CPR properly, take an accredited first-aid training course, including CPR and how to use an automated external defibrillator (AED). If you are untrained and have immediate access to a phone, call 911 or your local emergency number before beginning Cardiopulmonary resuscitation (CPR).

6.0 TUTOR-MARKED ASSIGNMENT

Define the term Cardiopulmonary resuscitation?

7.0 REFERENCES/FURTHER READING

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UNIT 2 MOUTH –TO-MOUTH RESUSCITATION

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main content
 - 3.1 Definition of term
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

Mouth-to-mouth resuscitation, a form of artificial ventilation, is the act of assisting or stimulating respiration in which a rescuer presses his or her mouth against that of the victim and blows air into the person's lungs.

2.0 OBJECTIVE

At the end of this unit, what is meant by mouth –to-mouth resuscitation.

3.0 MAIN CONTENT

3.1 Mouth –to-Mouth Resuscitation

Mouth-to-mouth resuscitation, a form of artificial ventilation, is the act of assisting or stimulating respiration in which a rescuer presses his or her mouth against that of the victim and blows air into the person's lungs.

If you try to resuscitate someone using chest compressions only, you can't go wrong. People who provide first aid don't necessarily have to give the person rescue breaths: But if you feel confident that you can do it, for instance following a first aid course, you should combine chest compressions with mouth-to-mouth resuscitation – at a ratio of “30 to 2”: After doing 30 chest compressions, you give the unconscious person two rescue breaths, followed by 30 chest compressions, and so on. It's very important to give the rescue breaths quickly, so you don't interrupt the chest compressions for long. The rescue breaths shouldn't take longer than ten seconds in total.

This is how to give mouth-to-mouth resuscitation:

- Gently tilt the person's head back. Use one hand to hold their chin and lift it up, then keep their mouth open using your thumb.

- Place your other hand on their forehead and pinch their nose with your index finger (pointer finger) and thumb.
- Take a normal breath, cover and seal their open mouth with yours, and blow into their mouth for about one second. Their chest should rise visibly when you breathe into their mouth, and sink again as soon as you move away.

4.0 CONCLUSION

After doing 30 chest compressions, you give the unconscious person two rescue breaths, followed by 30 chest compressions, and so on. It's very important to give the rescue breaths quickly, so you don't interrupt the chest compressions for long. The rescue breaths shouldn't take longer than ten seconds in total.

5.0 SUMMARY

If you try to resuscitate someone using chest compressions only, you can't go wrong. People who provide first aid don't necessarily have to give the person rescue breaths: But if you feel confident that you can do it, for instance following a first aid course, you should combine chest compressions with mouth-to-mouth resuscitation – at a ratio of “30 to 2”.

6.0 TUTOR-MARKED ASSIGNMENT

Define the term mouth-to-mouth resuscitation

7.0 REFERENCES/FURTHER READING

"Decisions about cardiopulmonary resuscitation model information leaflet". British Medical Association. Overview of CPR". American Heart Association. 2005. Archived from the original on 27 June 2007. Retrieved 2007-06-15.

UNIT 3 CHEST COMPRESSIONS

- 1.0 Introduction
- 2.0 Objective
- 3.0 Main content
 - 3.1 Chest compression
 - 3.2 The use of compression and ventilation together
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

Unlike cessation of respiration, an obvious sign of sudden death, the cessation of circulation, and particularly the rhythm of the heart, is not as easy to spot for a lay observer, although a trained eye now can see signs such as lack of perfusion. Perhaps as a result of this being less obvious, the appreciation of artificial circulation as a key factor in resuscitation lagged considerably behind the obvious need for artificial respirations.

If the scientists working on the problem appreciated the need to circulate blood, there was simply no effective means to do so. Even though closed chest massage was described in 1904, its benefit was not appreciated and anecdotal case reports did little to promote the benefit of closed chest massage. The prevailing belief was described in a physician's quote from 1890, "We are powerless against paralysis of the circulation."

2.0 OBJECTIVE

At the end of this unit, you will get to know what is meant by the term chest compression.

3.0 MAIN CONTENT

3.1 Chest compression

Unlike cessation of respiration, an obvious sign of sudden death, the cessation of circulation, and particularly the rhythm of the heart, is not as easy to spot for a lay observer, although a trained eye now can see signs such as lack of perfusion. Perhaps as a result of this being less obvious, the appreciation of artificial circulation as a key factor in resuscitation lagged considerably behind the obvious need for artificial respirations.

If the scientists working on the problem appreciated the need to circulate blood, there was simply no effective means to do so. Even though closed chest massage was described in 1904, its benefit was not appreciated and anecdotal case reports did little to promote the benefit of closed chest massage. The prevailing belief was described in a physician's quote from 1890, "We are powerless against paralysis of the circulation."

The formalised system of chest compression was really an accidental discovery made in 1958 by [William Bennett Kouwenhoven](#), Guy Knickerbocker, and James Jude at [Johns Hopkins University](#). They were studying [defibrillation](#) in dogs when they noticed that by forcefully applying the paddles to the chest of the dog, they could achieve a pulse in the [femoral artery](#). Further meticulous experimentation involving dogs answered such basic questions as how fast to press, where to press, and how deep to press. This information gave them the belief that they were ready for human trials.

The first person saved with this technique was recalled by Jude: "She was rather an obese female who ... went into cardiac arrest as a result of flurothane anesthetic. This woman had no blood pressure, no pulse, and ordinarily we would have opened up her chest. Instead, since we weren't in the operating room, we applied external cardiac massage. Her blood pressure and pulse came back at once. We didn't have to open her chest. They went ahead and did the operation on her, and she recovered completely."

In 1960 the three investigators reported their findings on 20 cases of in-hospital cardiac arrest in JAMA. Fourteen of the 20 patients (70%) survived and were discharged from the hospital. Many of the patients were in cardiac arrest as a result of anaesthesia. Three patients were documented to be in [ventricular fibrillation](#). The duration of chest compression varied from less than 1 minute to 65 minutes. The JAMA article was very straightforward: chest compression buys time until the external defibrillator arrives on the scene. As the authors write in the article, "Anyone, anywhere, can now initiate cardiac resuscitative procedures. All that is needed is two hands". However, respiration received relatively little attention in the 1960 JAMA article. Many of the patients had been intubated and thus the need for mouth-to-mouth ventilation was not necessary. It was not long however, before this newly discovered technique was used in conjunction with the longer held techniques of artificial respiration.

3.2 The use of compression and ventilation together

The formal connection of chest compression with mouth-to-mouth ventilation to create CPR as it is practiced today occurred when Safar, Jude, and Kouwenhoven presented their findings at the annual Maryland Medical Society meeting on September 16, 1960 in Ocean City. In the opening remarks the moderator said, "Our purpose today is to bring to you, then, this new idea." It was so new that it was still without a name. The moderator stated that the two techniques "cannot be considered any longer as separate units, but as parts of a whole and complete approach to resuscitation". In his remarks Safar stressed the importance of combining ventilation and circulation. He presented convincing data that chest compression alone did not provide effective ventilation; mouth-to-mouth respiration had to be part of the equation.

To promote CPR, Jude, Knickerbockers, and Safar began a world speaking tour. In 1962 Gordon, along with David Adams, produced a 27-minute training film called "The Pulse of Life." The film was used in CPR classes and viewed by millions of students. For the film, Gordon and Adams devised the easy to remember mnemonic of A, B & C standing for the sequence of steps in CPR, airway, breathing, circulation. However the order has been revised to C, A, B, putting the emphasis on compressions first. The reason being that oxygen reserves in the body have been found to be adequate to maintain oxygenation of the blood. In 1963 cardiologist Leonard Scherlis started the American Heart Association's CPR Committee, and in the same year, the Heart Association formally endorsed CPR. In May 1966 the National Research Council of the National Academy of Sciences convened an ad hoc conference on cardiopulmonary resuscitation. The conference was the direct result of requests from the American National Red Cross and other agencies to establish standardized training and performance standards for CPR. Over 30 national organizations were represented at the conference. Recommendations from this conference were reported in JAMA in 1966.

4.0 CONCLUSION

In 1963 cardiologist Leonard Scherlis started the American Heart Association's CPR Committee, and in the same year, the Heart Association formally endorsed CPR. In May 1966 the National Research Council of the National Academy of Sciences convened an ad hoc conference on cardiopulmonary resuscitation.

5.0 SUMMARY

The formal connection of chest compression with mouth-to-mouth ventilation to create CPR as it is practiced today occurred when Safar, Jude, and Kouwenhoven presented their findings at the annual Maryland Medical Society meeting on September 16, 1960 in Ocean City. In the opening remarks the moderator said, "Our purpose today is to bring to you, then, this new idea." It was so new that it was still without a name.

6.0 TUTOR-MARKED ASSIGNMENT

Write on chest compression
are powerless against paralysis of the circulation.

7.0 REFERENCES/FURTHER READING

Johnson, A. An account of some societies at Amsterdam and Hamburg for the recovery of drowned persons, 1773, London, p. 119.

Cary, R. J. (1918). "A brief history of the methods of resuscitation of the apparently drowned". *Journal of Johns Hopkins Hospital Bulletin*. **270**: 243–251.

UNIT 4 DEFIBRILLATION

- 1.0 Introduction
- 2.0 Objectives
- 3.0 Main content
 - 3.1 Definition of term
- 4.0 Conclusion
- 5.0 Summary
- 6.0 Tutor-marked Assignment
- 7.0 References/Further Reading

1.0 INTRODUCTION

As early as the 1930s it was known that electric shocks, even small shocks, could induce ventricular fibrillation in dogs' hearts and more powerful shocks could reverse the fibrillation. This early research had been funded by the electric industry concerned about fatal accidents to linemen. [Claude Beck](#), professor of surgery at Western Reserve University (later to become [Case Western Reserve University](#)) in Cleveland worked for years on a technique for defibrillation of the human heart. Beck believed that electricity could equally benefit the surgery patient whose heart fibrillated during surgery or induction of anaesthesia.

2.0 OBJECTIVES

At the end of this unit, the student will get to know what is meant by the term Defibrillation.

3.0 MAIN CONTENT

3.1 Definition of term

As early as the 1930s it was known that electric shocks, even small shocks, could induce ventricular fibrillation in dogs' hearts and more powerful shocks could reverse the fibrillation. This early research had been funded by the electric industry concerned about fatal accidents to linemen. [Claude Beck](#), professor of surgery at Western Reserve University (later to become [Case Western Reserve University](#)) in Cleveland worked for years on a technique for defibrillation of the human heart. Beck believed that electricity could equally benefit the surgery patient whose heart fibrillated during surgery or induction of anaesthesia.

Beck probably witnessed his first cardiac arrest during his internship in 1922 while on the surgery service at the Johns Hopkins Hospital. During

a urologic operation, the anaesthetist announced that the patient's heart had stopped. To the amazement of Beck, the surgical resident removed his gloves and went to a telephone in a corner of the room and called the fire department. Beck remained in total bewilderment as the fire department rescue squad rushed into the operating room 15 minutes later and applied oxygen-powered respirators to the patient's face. The patient died, but the episode left an indelible impression on him. Beck would go on to develop techniques to take back the management of cardiac arrest from the fire department and place it in the hands of surgeons.

Beck realized that ventricular fibrillation often occurred in hearts that were basically sound and he coined the phrase "Hearts too good to die." In 1947, Beck accomplished his first successful resuscitation of a 14-year-old boy using open chest massage and internal defibrillation with alternating current. The boy was being operated on for a severe congenital [funnel chest](#). In all other respects the boy was normal. During the closure of the large incision in the chest, the pulse suddenly stopped and the blood pressure fell to zero. The boy was in [cardiac arrest](#). Dr. Beck immediately reopened the chest and began manual heart massage. As he looked at and felt the heart, he realized that ventricular fibrillation was present. Massage was continued for 35 minutes at which time an [electrocardiogram](#) was taken that confirmed the presence of ventricular fibrillation. Another 10 minutes passed before the [defibrillator](#) was brought to the operating room. The first shock using electrode paddles placed directly on the sides of the heart was unsuccessful. Beck administered procaine amide, a medicine to stabilize the heart's rhythm. Beck gave a second shock that wiped out the fibrillation. In a very few seconds a feeble, regular, and fast contraction of the heart occurred. The blood pressure rose from zero to 50 millimeters of mercury. Beck noted that the heartbeat remained regular and saw that the pressure slowly began to rise. Twenty minutes after the successful defibrillation, the chest wound was closed. By three hours, the blood pressure rose to a normal level, and the child awoke and was able to answer questions. The boy made a full recovery, with no neurological damage.

Beck pioneered internal defibrillation of the heart. In other words, the chest had to be open and the defibrillator paddles placed directly on the heart. It was ground breaking work but soon to be eclipsed by devices that could externally defibrillate the heart through the closed chest.

For [Paul Zoll](#), well aware of Beck's accomplishment, the development of an external defibrillator was a natural extension of his earlier work with an external cardiac pacemaker. In 1955 a 67-year-old man survived several episodes of ventricular fibrillation, thanks to Zoll's external defibrillator, and went home from the hospital a month later. Over a

period of four months, Zoll had successfully stopped ventricular fibrillation eleven times in four different patients. The energy required for defibrillation ranged from 240 to 720 joules. Zoll's findings were published in the [New England Journal of Medicine](#) in 1956.

The defibrillator designed by Zoll, as well as earlier versions invented by Kouwenhoven and Beck, utilized alternating current and were run from line voltage, the electricity from any wall socket. The decision to use alternating current rather than direct current was a practical one. Direct current batteries and capacitor technology both powerful enough to do the job and portable enough for practical use simply didn't exist in the early 1950s. These AC defibrillators were very large and heavy, primarily because they contained a transformer to step up the line voltage from 110 volts to 500 or 1000 volts. The only good feature is that they could be mounted on wheels and pushed down the hallway from one part of the hospital to another. Not many lives would be saved unless the inherent non-portability of AC defibrillators could be solved.

The portability problem was solved by [Bernard Lown](#). Lown devised a defibrillator that utilized direct current instead of alternating current. A series of animal experiments on dogs in 1960 and 1961 and clinical uses in patients in the early 1960s established that DC shocks were extremely effective in shocking the heart. What's more, it was clear that DC was actually safer than AC when applied through the chest wall. With direct current it was possible to use power, supplied by a battery, to charge a capacitor over a few seconds. The capacitor stored the energy until it was released in one massive jolt to the chest wall. The availability of new, small capacitors considerably reduced the size and weight of the device. The defibrillator could now travel to the patient.

The first out of hospital defibrillation

The National Highway Safety and Traffic Act of 1966 authorized the Department of Transportation to establish a national curriculum for prehospital personnel, which led to the training of [emergency medical technicians](#) (EMTs). EMTs did much to upgrade the general performance of [ambulance](#) services throughout the United States. Their 80-hour course and certification, which included CPR, ensured that proper care would be provided to victims of motor vehicle accidents and other emergencies. Thus they could provide artificial ventilation and closed-chest massage at the scene and en route to the hospital.

However, EMTs were neither trained nor authorized to provide definitive care for cardiac arrest. They could not provide defibrillation; intravenous medications; or advanced airway control, such as endotracheal intubation. EMTs saved few, if any, victims of sudden cardiac arrest, largely because cardiac arrest occurred mostly in people's

homes. The time required for EMTs to arrive and transport the patient to the closest emergency department was too long for resuscitation to be successful. Not even letter-perfect CPR can save a life if it takes too long for defibrillation and other advanced procedures to occur.

In 1965, [Frank Pantridge](#) turned his attention to this vexing problem of heart attacks and sudden cardiac death. His sensitivity to the problem came from two sources. First, personnel in the emergency department of the Royal Victoria Hospital in [Belfast](#) frequently commented on the number of patients coming in dead on arrival (DOA). Second, Pantridge had recently read a telling study in a medical journal that indicated that among middle-aged or younger men with acute [myocardial infarction](#) (MI), more than 60% died within 1 hour of the onset of symptoms. Thus the problem of death from acute MI had to be solved outside the hospital, not in the emergency room or the coronary care unit. "The majority of deaths from coronary attacks were occurring", he wrote, "outside the hospital, and nothing whatever was being done about them. It became very clear to me that a coronary care unit confined to the hospital would have a minimal impact on mortality." He wanted his coronary-care unit in the community.

Pantridge's solution was to develop the world's first mobile coronary-care unit, or MCCU. He staffed it with an ambulance driver, a physician, and a nurse. Pantridge encountered numerous obstacles to the creation of the MCCU. He dealt with them in his typical direct fashion, with determination to succeed and transparent contempt for politicians and any authority figure who opposed him. Even his cardiology colleagues were skeptical. "My noncardiological medical colleagues in the hospital were totally unconvinced and totally uncooperative," Pantridge said. "It was considered unorthodox, if not illegal, to send junior hospital personnel, doctors, and nurses outside the hospital."

John Geddes was a resident in cardiology at the Royal Victoria Hospital in Belfast and worked on Pantridge's service. As junior member of the team it was Geddes' responsibility, which he shared with four other residents on the service, to ride on the newly christened ambulance when it was called into service.

Why did this breakthrough in cardiac care occur in Belfast, of all places? Geddes thought he knew the answer:

"I would say two reasons. One was Pantridge himself. He is a remarkable personality who is very persuasive. He can persuade people to do things, and . . . actually make them enjoy doing things that he has made them do because they are successful. So there was his tremendous enthusiasm behind the system. Then there was the fact that the layout of

the [Royal Victoria] hospital was flat and it was quick and easy to get to people and resuscitate them. I didn't realize this at the time, but I subsequently visited hospitals in various parts of England. They had slow elevators and so on, and you could never move around the hospital quickly with any kind of emergency apparatus."

The success in the hospital wards made them believe success in the community would be possible. So it was the combination of a hospital's architectural layout and a physician's driving and persuasive personality that provided the impetus for this breakthrough. But one cannot discount the resuscitation infrastructure already in place: mouth-to-mouth ventilation, chest compression, and portable defibrillation. Without each of these three elements the Belfast program would have been a waste of time and effort.

The team reported the initial results of their program in the August 5, 1967 issue of [The Lancet](#); their findings on 312 patients covered a 15-month period. Half the patients had MI and there were no deaths during transportation. Of ground-breaking importance was the information on 10 patients who had cardiac arrest. All had ventricular fibrillation; six arrests occurred after the arrival of the MCCU, and four occurred shortly before arrival of the ambulance. All 10 patients were resuscitated and admitted to the hospital. Five were subsequently discharged alive. The article has historical importance because it served to stimulate pre-hospital emergency cardiac care programs throughout the world.

The Belfast system was established to reach patients with [acute myocardial infarction](#). The resuscitated patients were those whose hearts fibrillated after the ambulance was at the scene or en route. The system reacted too slowly to resuscitate persons who fibrillated before the call was placed. In 1966, it was assumed that most cardiac deaths in the community were the result of acute myocardial infarction. It was not appreciated that ventricular fibrillation can occur without myocardial infarction and have only seconds of warning – or none at all.

4.0 CONCLUSION

The resuscitated patients were those whose hearts fibrillated after the ambulance was at the scene or en route. The system reacted too slowly to resuscitate persons who fibrillated before the call was placed.

5.0 SUMMARY

In 1966, it was assumed that most cardiac deaths in the community were the result of acute myocardial infarction. It was not appreciated that

ventricular fibrillation can occur without myocardial infarction and have only seconds of warning – or none at all.

6.0 TUTOR-MARKED ASSIGNMENT

1. Explain the term defibrillation?
2. What is the medical use of defibrillation?

7.0 REFERENCES/FURTHER READING

Ong, M. E; Lim, S; Venkataraman, A. (2016). "Defibrillation and cardioversion". In Tintinalli JE; (eds.). Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 8e. McGraw-Hill (New York, NY).

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