

**FEDERAL UNIVERSITY OF TECHNOLOGY, OWERRI**

**SCHOOL OF HEALTH TECHNOLOGY**

**12<sup>TH</sup> EDITION OF LECTURE SERIES**

**TOPIC:**

**SUDDEN DEATH : WHAT DO WE KNOW ABOUT IT  
AND HOW DO WE PREVENT IT?**

**LECTURER:**

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Sudden Death: What Do We Know About It and How Do We Prevent It by Emerole, C. O. is licensed under a [Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License](https://creativecommons.org/licenses/by-nc-nd/4.0/).

### 3. ETIOLOGY/CAUSES

The major causes of sudden death are discussed below and can be categorised as cardiac and non-cardiac.

#### NON-CARDIAC CAUSES OF SUDDEN DEATH

The non-cardiac causes of Sudden Death include:

##### 1. Trauma:

These include; deaths from blunt force, penetrating trauma, such as may be experienced in collision sports (eg subdural haematoma, cervical spine fractures etc. Road and air accidents are also inclusive.

##### 2. Violence

Many people have died suddenly from homicide or suicide through violence.

##### 3. **Acute Haemorrhagic Shock** (e.g ruptured aortic aneurysm, bleeding peptic ulcer).

##### 4. **Septic Shock** from sepsis.

##### 5. Sports

Regular physical activity has several beneficial effects on health and is linked with reduced cardiovascular and all-cause mortality. However in certain circumstances, an acute bout of exertion may cause dangerous health effects and in extreme cases sudden death (the so called paradox of exercise).

Regular physical activity has several beneficial effects on health and is linked with reduced cardiovascular and all-cause mortality. However in certain circumstances an acute bout of exertion may cause dangerous health effects and in extreme cases sudden death (the so called paradox of exercise – so called exercise related sudden death (ESD) which is usually referred to as unexpected and witnessed sudden cardiac arrest occurring within one hour from an exercise bout in an apparently healthy person. In the sporting world, sudden death has become an all familiar spectacle. In the young athlete below 30 years old heart conditions especially hypertrophic cardiomyopathy play a major role in sudden death and the older athlete summary partery disease. The leading respiratory cause.

## 6. Asthma:

This is a chronic breathing disorder characterised by recurrent attacks of breathlessness and wheezing. According to WHO (2011) estimates, 235 million suffer from asthma globally. If not properly attended to, an asthmatic attack could lead to sudden death. Although the fundamental causes of asthma are not completely understood, the strongest risk factors for developing asthma are inhaled asthma triggers. These include:

- Indoor allergens (e.g. house dust mites in bedding, carpets and stuffed furniture)
- Outdoor allergens (such as pollens)
- Tobacco smoke and
- Chemical irritants in the workplace.
- Others include extreme emotional arousal such as anger or fear and physical exercise and medications such as aspirin and non-steroid anti-inflammatory drugs.

## 7. Diabetes mellitus

Diabetes is a chronic disease that occurs either when the pancreas does not produce enough insulin or when the body cannot effectively use the insulin it produces. Insulin is a hormone that regulates blood sugar. Raised blood sugar, a common effect of uncontrolled diabetes and over time leads to serious damage to many body systems and it could lead to sudden death from heart disease and stroke. Hypoglycaemia also increases the risk of sudden death in patients with advanced cardiovascular disease. It also causes death from cerebral damage.

In 2012, 347 million people worldwide had diabetes and an estimated 3.4 million people died from consequences of high fasting blood sugar in 2004. More than 80% of

diabetes death occurs in low and middle-income countries.

## CARDIOVASCULAR CAUSES OF SUDDEN DEATH

Many cardiovascular diseases can cause sudden cardiac death (SCD) either through an arrhythmic mechanism (electrical SCD) or by compromising the mechanical function of the heart (mechanical SCD). These disorders may affect the coronary arteries, the myocardium, the cardiac valves, the conducting system, the aorta or the pulmonary artery, the integrity of which is essential for a regular heart function. WHO estimates that more than 17.3 people died of cardiovascular diseases such as heart attack or stroke in 2008. Four out of five of these deaths occurred in low and middle-income countries and men and women were equally affected.

The cardiovascular causes of sudden death can be due to the following:-

1. **Hypertension**

High blood pressure is one of the most important presentable causes of premature death worldwide. High blood pressure is defined a systolic blood pressure above 140 mmHg and/or a diastolic blood pressure above 90mmHg. In people aged up to 56 years both systolic and Diastolic blood pressure are associated with cardiovascular risk such as stroke. Above this age systolic blood pressure is a far more important prediction. Blood pressure usually rises with age. Long standing hypertension lead to enlargement of the left ventricle which can cause abnormal heart rhythm.

2. **Stroke**

Strokes are caused by disruption of the blood supply to the brain. This may result from either blockage or rupture of a blood vessel. The risk factors of stroke include High Blood Pressure and Heart rhythm disorder.

3. **Congenital Heart Diseases**

Malformations of heart structures existing at birth may be caused by genetic factors or by adverse exposures during pregnancy. Examples are holes in the heart, abnormal valves and abnormal chambers. The risk factors to congenital heart disease include maternal alcohol use, medicines, used by the expectant mother maternal infections such as rubella, for maternal nutrition (low intake of folate) and close blood relationship between parents. E.g. include Hcm, Long QT syndrome and marfan syndrome.

4. **Aortic Aneurysm**

This dilatation and rupture of the aortic. The risk factors include Advancing age, long standing high blood pressure, congenital heart disorders syphilis and other infections and inflammatory disorders.

5. **Deep Venous Thrombosis (DVT) & Pulmonary Embolism**

Blood clots in the leg veins, which can dislodge and move to the heart and lungs. The risk factors include; surgery, obesity, cancer, previous episode of DVT, recent child birth, use of oral contraceptive, long periods of immobility for example while travelling.



## RISK FACTORS TO SUDDEN DEATH FROM CARDIOVASCULAR DISEASES

This can be categorized as followed:

### **Major modifiable risk factors:**

- ***High Blood Pressure***  
Major risk for heart attack and the most important risk factor for stroke.
- ***Abnormal blood lipids***  
High total cholesterol, LDL-cholesterol and triglyceride levels, and low levels of HDL-cholesterol increase risk of coronary heart disease and ischaemic stroke
- ***Tobacco use***  
Increases risks of cardiovascular disease, especially in people who started young, and heavy smokers. Passive smoking an additional risk.
- ***Physical inactivity***  
Increase risk of disease and stroke by 50%
- ***Obesity***  
Major risk for coronary heart disease and diabetes.
- ***Unhealthy diets***  
Low fruits and vegetable intake is estimated to cause about 31% of coronary heart disease and 11% of stroke worldwide; high saturated fat intake increases the risk of heart diseases and stroke through its effect on blood lipids and thrombosis.
- ***Diabetes mellitus***  
Major risk for coronary heart disease and stroke.

### **Other modifiable risk factors;**

- ***Low socioeconomic status (SES)***  
There is consistent inverse relationship with risk of heart disease and stroke.
- ***Mental Ill-Health***  
Depression is associated with an increased risk of coronary heart disease.
- ***Psychosocial stress***  
Chronic life stress, social isolation and anxiety increase the risk of heart disease and stroke.
- ***Alcohol use***

One to two drinks per day may lead to a 30% reduction in heart disease, but heavy drinking damages the heart muscle.

- ***Use of certain medication***

Some oral contraceptives and hormone replacement therapy increase risk of heart disease.

- ***Lipoprotein(a)***

Increase risk of heart attacks especially in presence of high LDL-cholesterol.

#### **Non-modifiable risk factors**

- ***Advancing age***

Most powerful independent risk factor for cardiovascular disease, risk of stroke doubles every decade after age 55.

- ***Heredity or family history***

Increased risk if a first-degree blood relative has had coronary heart disease or stroke before the age of 55 years (for a male relative) or 65 years (for a female relative).

- ***Gender***

Higher rates of coronary heart disease among men compared with women (premenopausal age); risk of stroke is similar for men and women.

- ***Ethnicity or race***

Increased stroke noted for blacks, some Hispanic American, Chinese, and Japanese populations. Increased cardiovascular disease deaths noted for South Asians and American Blacks in comparison with Whites.

#### **"Novel" risk factors**

- ***Inflammation***

Several inflammatory markers are associated with increased cardiovascular risk, e.g. elevated C-reactive protein (CRP).

- ***Abnormal blood coagulation***

Elevated blood levels of fibrinogen and other markers of blood clotting increase the risk of cardiovascular complications.

## PREVENTION AND CONTROL OF SUDDEN DEATH

Some of the prevention and control measures include:

- Health education to promote choices, Schools for example provide ideal venue for health education, schools programmes must also lead by example by making healthy food available, providing exercise facilities, prohibiting to use of all school events and helping students and staff lose weight.

### SCREENING

The step in this approach is the performance of autopsy after the death of a young individual. Second, it consist of comprehensive cardiological and genetic examination in first-degree relatives of the deceased (when autopsy reveals an inherited cardiac disease, does not reveal any abnormalities, or was not performed).

Autopsy is able to reveal the cause of death in more than 80% of cases. In the case of SCD caused by an inherited cardiac disease or SUD, surviving first-degree relatives of the SD victim are advised to have cardiological and genetic examination. If a noninherited cardiac disease at autopsy is identified, relatives can be reassured accordingly.

- Increasing taxes on alcohol and cigarettes to reduce use
- Providing walkways in urban areas to promote walking and physical exercise
- Providing recreational facilities for physical activity
- Promoting sporting activities like football
- Organizing music competitions
- Provide nutritional information on food contents.
- Periodic medical screening for heart diseases. Comprehensive cardiological and genetic assessment of first-degree relatives is ideally performed by a multidisciplinary team including cardiologists, clinical geneticists, genetic counsellors, and psychosocial workers.

The assessment starts with genetic counselling before testing, which emphasizes the advantages (for example, the possible measure to prevent SCD when an inherited cardiac disease is diagnosed) and disadvantages (for example, difficulties in getting life insurance). Subsequently, detailed medical information on the proband and the attending first-degree relatives is obtained, as well as a family history including a 3-generation pedigree, and a baseline ECG is made. Further steps depend on the information collected.

- providing and equipping health facilities to tackle emergencies e.g provision of Automated External Detribillators (AEDs)
- Training the citizenry to be able to carry out cardiopulmonary emergency and in the use of (AEDs).

##### 5. CONCLUSION:

The occurrence of sudden death is usually a traumatic experience for relatives and loved ones. The majority of these deaths as have been found are of cardiac origin.

Above 35 years of age, the majority of causes are due to the thickening and deposits in the coronary food vessels supplying the heart itself with blood. Below 30 years sudden deaths of from cardiac origin are due to structural defects is the hearts that are sometimes largely hereditary.

Sudden deaths are largely preventable through leading healthy life styles and going for regular medical check checks and screening.

In all this, how most pathetic it is sometimes that it happens when some of the victims are performing their conjugal responsibilities and unfortunately in the course of being randy.

May God continue to guide us all aright and grant us long life. Amen.

Thank you.

## APPENDIX 1- CARDIAC RISK INDICES SCORING SHEET

To score your cardiac risk index, total the point values from the small boxes as they relate to you for each of the eight factors listed.

1. Age (Years)	10 to 20 1	21 to 30 2	31 to 40 3	41 to 50 4	51 to 60 6	61 to 70+ 8
2. Heredity	No known history of heart disease 1	1 relative with cardiovascular disease over 60 2	2 relative with cardiovascular disease over 60 3	1 relative with cardiovascular disease under 60 4	2 1 relative with cardiovascular disease under 60 6	3 relative with cardiovascular disease under 60 8
3. Weight	More than 5 lbs. Below standard weight 0	Standard weight 1	5-20 lbs overweight 2	21-35 lbs overweight 3	36-50 lbs overweight 5	51-65 lbs overweight 7
4 Height						
5. Tobacco smoking	Nonuser	Cigar and/or pipe 1	10 cigarettes or less a day 2	20 cigarettes or a day 3	30 cigarettes a day 5	40 cigarettes or less a day or more 8
Exercise	Intensive occupational and recreational exertion 1	Moderate occupational and recreational exertion 2	Sedentary work and intense recreational exertion 3	Sedentary occupational and moderate recreational exertion 5	Sedentary work and light recreational exertion 6	Complete lack of all exercise 8
7. Cholesterol or % fat in diet	Cholesterol below 180mg. Diet contains no animal or solid fats 1	Cholesterol 181-205mg. Diet contains 10% animal or solid fats 2	Cholesterol 206-230mg. Diet contains 20% animal or solid fats 3	Cholesterol 231-255mg. Diet contains 30% animal or solid fats 4	Cholesterol 256-280mg. Diet contains 40% animal or solid fats 5	Cholesterol 261-330mg. Diet contains 50% animal or solid fats 7
8. Blood pressure	100 upper reading 1	120 upper reading 2	140 upper reading 3	160 upper reading 4	180 upper reading 6	200 or over upper reading 8
9. Sex	Female 1	Female over 45 2	Male 3	Bald male 4	Bald short male 6	Bald short stocky male 7

Total score: \_\_\_\_\_

### Cardiovascular Disease Risk Index Scoring Table

Group I 6 to 11 = very low risk  
Group II 12 to 17 = low risk  
Group III 18 to 25 = average risk

Group IV 26 to 32 = high risk  
Group V 33 to 42 = dangerous risk  
Group VI 42 to 60 = extremely dangerous risk

## APPENDIX VI

### ADVICE ON DIET, ALCOHOL AND TOBACCO USE, EXERCISE AND BLOOD PRESSURE

- **SALT**

Restrict to less than 5 grams (1 teaspoon) per day. Reduce salt when cooking; limit processed and fast foods.

- **FRUITS AND VEGETABLES**

5 Servings (400 – 500 grams) of fruits and vegetable per day.  
1 serving is equivalent to 1 orange or apple or mango or banana or 3 teaspoons of cooked vegetables.

- **FATTY FOOD**

Limit fatty meat, dairy fat and cooking oil (less than two tablespoons per day).

Replace palm or coconut oil with olive/soya/corn oil.

- **FISH**

Eat fish at least three times per week, preferably oily fish such as tuna, mackerel, salmon.

- **ALCOHOL**

Avoid heavy alcohol intake.

- **TOBACCO**

Avoid tobacco use

- **PHYSICAL ACTIVITY**

Progressively increase moderate physical activity such as brisk walking, cycling to at least 30 minutes per day.

- **CHECK YOUR BLOOD PRESSURE AND BODY WEIGHT REGULARLY.**

Avoid high blood pressure and over weight.

# Automated external defibrillator

From Wikipedia, the free encyclopedia

An **automated external defibrillator (AED)** is a portable electronic device that automatically diagnoses the life-threatening cardiac arrhythmias of ventricular fibrillation and ventricular tachycardia in a patient,<sup>[1]</sup> and is able to treat them through defibrillation—the application of electrical therapy which stops the arrhythmia, allowing the heart to reestablish an effective rhythm.

With simple audio and visual commands, AEDs are designed to be simple to use for the layperson, and the use of AEDs is taught in many first aid, certified first responder, and basic life support (BLS) level cardiopulmonary resuscitation (CPR) classes.<sup>[2]</sup>



An automated external defibrillator, open and ready for pads to be attached

## Contents

- 1 Usage
  - 1.1 Conditions that the device treats
  - 1.2 Effect of delayed treatment
  - 1.3 Requirements for use
- 2 Placement and availability
- 3 Preparation for operation
- 4 Mechanism of operation
- 5 Simplicity of use
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## Usage

### Conditions that the device treats

An automated external defibrillator is used in cases of life-threatening cardiac arrhythmias which lead to cardiac arrest. The rhythms that the device will treat are usually limited to:

1. Pulseless Ventricular tachycardia (shortened to VT or V-Tach)<sup>[1]</sup>
2. Ventricular fibrillation (shortened to VF or V-Fib)





In each of these two types of shockable cardiac arrhythmia, the heart is electrically active, but in a dysfunctional pattern that does not allow it to pump and circulate blood. In ventricular tachycardia, the heart beats too fast to effectively pump blood. Ultimately, ventricular tachycardia leads to ventricular fibrillation. In ventricular fibrillation, the electrical activity of the heart becomes chaotic, preventing the ventricle from effectively pumping blood. The fibrillation in the heart decreases over time, and will eventually reach asystole.

AEDs, like all defibrillators, are not designed to shock asystole ('flat line' patterns) as this will not have a positive clinical outcome. The asystolic patient only has a chance of survival if, through a combination of CPR and cardiac stimulant drugs, one of the shockable rhythms can be established, which makes it imperative for CPR to be carried out prior to the arrival of a defibrillator.

## Effect of delayed treatment

Uncorrected, these cardiac conditions (ventricular tachycardia, ventricular fibrillation, asystole) rapidly lead to irreversible brain damage and death, once cardiac arrest takes place. After approximately three to five minutes in cardiac arrest,<sup>[3]</sup> irreversible brain/tissue damage may begin to occur. For every minute that a person in cardiac arrest goes without being successfully treated (by defibrillation), the chance of survival decreases by 7 percent per minute in the first 3 minutes, and decreases by 10 percent per minute as time advances beyond ~3 minutes.<sup>[4]</sup>

## Requirements for use

AEDs are designed to be used by laypersons who ideally should have received AED training. However, sixth-grade students have been reported to begin defibrillation within 90 seconds, as opposed to a trained operator beginning within 67 seconds.<sup>[5]</sup> This is in contrast to more sophisticated manual and semi-automatic defibrillators used by health professionals, which can act as a pacemaker if the heart rate is too slow (bradycardia) and perform other functions which require a skilled operator able to read electrocardiograms.

Bras with a metal underwire and piercings on the torso must be removed before using the AED on someone to avoid interference.<sup>[6][7]</sup> American TV show *Mythbusters* (<http://dsc.discovery.com/fansites/mythbusters/db/human-body/underwire-bra-mess-with-defibrillator.html>) found evidence that use of a defibrillator on a woman wearing an underwire bra can lead to arcing or fire but only in unusual and unlikely circumstances.

A study analyzed the effects of having AEDs immediately present during Chicago's Heart Start program over a two-year period. Of 22 individuals 18 were in a cardiac arrhythmia which AEDs can treat (Vfib or Vtach). Of these 18, 11 survived. Of these 11 patients, 6 were treated by bystanders with absolutely no previous training in AED use.<sup>[8][9]</sup>

## Placement and availability

Automated external defibrillators are generally either held by trained personnel who will attend events or are public access units which can be found in places including corporate and government offices, shopping centres, airports, airplanes,<sup>[10]</sup> restaurants, casinos, hotels, sports stadium, schools and universities, community centers, fitness centers, health clubs, theme parks, workplaces and any other location where people may congregate.

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# Backbone transmission

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Backbone transmission

The MPLS network inter-connecting member institutions is riding on a 10Gbps transmission capacity leased from two private telecommunications operators; Airtel Nigeria and Phase 3 Telecoms. NgREN also maintains access links to these institutions and owns and manages all core and edge network devices.

The topology of the first phase of the network has four cores anchored at collocation sites in Abuja, Kano, Lagos and Port Harcourt. The 29 members currently connected have last mile links terminating at these locations.

Subsequent phases of the network will feature an expansion in the number of these core sites to 14.

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The location of a public access AED should take into account where large groups of people gather, regardless of age or activity. Children as well as adults may fall victim to sudden cardiac arrest (SCA).

In many areas, emergency vehicles are likely to carry AEDs, with some ambulances carrying an AED in addition to manual defibrillators. Police or fire vehicles often carry an AED for use by first responders. Some areas have dedicated community first responders, who are volunteers tasked with keeping an AED and taking it to any victims in their area. AEDs are also increasingly common on commercial airliners, cruise ships, and other transportation facilities.

High-rise buildings are densely populated, but are more difficult to access<sup>[11]</sup> by emergency crews facing heavy traffic and security barriers. It has been suggested that AEDs carried on elevators could save critical minutes for cardiac arrest victims, and reduce their deployment cost.

In order to make them highly visible, public access AEDs are often brightly colored, and are mounted in protective cases near the entrance of a building. When these protective cases are opened or the defibrillator is removed, some will sound a buzzer to alert nearby staff to their removal, though this does not necessarily summon emergency services; trained AED operators should know to phone for an ambulance when sending for or using an AED. In September 2008, the International Liaison Committee on Resuscitation issued a 'universal AED sign' to be adopted throughout the world to indicate the presence of an AED, and this is shown on the right.<sup>[12]</sup>

An AED at a railway station in Japan.

A trend that is developing is the purchase of AEDs to be used in the home, particularly by those with known existing heart conditions.<sup>[13]</sup> The number of devices in the community has grown as prices have fallen to affordable levels. There has been some concern among medical professionals that these home users do not necessarily have appropriate training,<sup>[14]</sup> and many advocate the more widespread use of community responders, who can be appropriately trained and managed.

Typically, an AED kit will contain a face shield for providing a barrier between patient and first aider during rescue breathing; a pair of nitrile rubber gloves; a pair of trauma shears for cutting through a patient's clothing to expose the chest; a small towel for wiping away any moisture on the chest, and a razor for shaving those with very hairy chests.<sup>[15]</sup>

## Preparation for operation

Most manufacturers recommend checking the AED before every period of duty or on a regular basis for fixed units. Some units need to be switched on in order to perform a self check; other models have a self check system built in with a visible indicator

All manufacturers mark their electrode pads with an expiration date, and it is important to ensure that the pads are in date. This is usually marked on the outside of the pads. Some models are designed to make this date visible through a 'window', although others will require the opening of the case to find the date stamp.

is also important to ensure that the AED unit's batteries have not expired. The AED manufacturer will specify how often the batteries should be replaced. Each AED has a different recommended maintenance schedule lined out in the user manual. Common checkpoints on every checklist, however, also include a monthly check of the battery power by checking the green indicator light when powered on, condition and cleanliness of all cables and the unit, and check for the adequate supplies [16]

## Mechanism of operation

An AED is *external* because the operator applies the electrode pads to the bare chest of the victim, as opposed to internal defibrillators, which have electrodes surgically implanted inside the body of a patient.

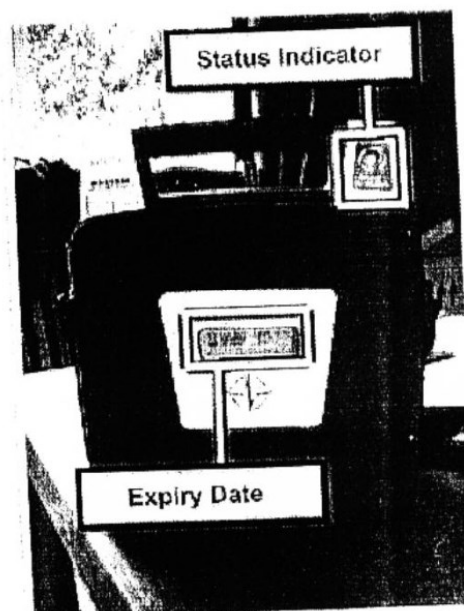
*Automatic* refers to the unit's ability to autonomously analyse the patient's condition, and to assist this, the vast majority of units have spoken prompts, and some may also have visual displays to instruct the user.

When turned on or opened, the AED will instruct the user to connect the electrodes (pads) to the patient. Once the pads are attached, everyone should avoid touching the patient so as to avoid false readings by the unit. The pads allow the AED to examine the electrical output from the heart and determine if the patient is in a shockable rhythm (either ventricular fibrillation or ventricular tachycardia). If the device determines that a shock is warranted, it will use the battery to charge its internal capacitor in preparation to deliver the shock. This system is not only safer (charging only when required), but also allows for a faster delivery of the electrical current.

When charged, the device instructs the user to ensure no one is touching the patient and then to press a button to deliver the shock; human intervention is usually required to deliver the shock to the patient in order to avoid the possibility of accidental injury to another person (which can result from a responder, bystander touching the patient at the time of the shock). Depending on the manufacturer and particular model, after the shock is delivered most devices will analyze the patient and either instruct CPR to be given, or administer another shock.

Many AED units have an 'event memory' which store the ECG of the patient along with details of the time the unit was activated and the number and strength of any shocks delivered. Some units also have voice recording abilities to monitor the actions taken by the personnel in order to ascertain if these had any impact on the survival outcome. All this recorded data can be either downloaded to a computer or printed out so that the providing organisation or responsible body is able to see the effectiveness of both CPR and defibrillation. Some AED units even provide feedback on the quality of the compressions provided by the rescuer. [17]

The first commercially available AEDs were all of a monophasic type, which gave a high-energy shock up to 360 to 400 joules depending on the model. This caused increased cardiac injury and in some cases second and third-degree burns around the shock pad sites. Newer AEDs (manufactured after late 2000) have tended to utilise biphasic algorithms which give two sequential lower-energy shocks of 120 - 200



The use of easily visible status indicator and pad expiration date on one model of AED

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# Border Gateway Protocol (BGP) Peering

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Border Gateway Protocol (BGP) Peering

To promote good corporate net citizenship, NgREN encourages all its members to acquire and own their IP resources from Afrinic. NgREN therefore provides BGP peering to ensure that members are able to preserve their identities on the internet even as they enjoy services from the NgREN and other service providers as they deem fit.

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**President Jonathan happy with NaREN...**



waves, with each shock moving in an opposite polarity between the pads. This lower-energy waveform has proven more effective in clinical tests, as well as offering a reduced rate of complications and reduced recovery time.<sup>[18]</sup>

## Simplicity of use

Unlike regular defibrillators, an automated external defibrillator requires minimal training to use. It automatically diagnoses the heart rhythm and determines if a shock is needed. Automatic models will administer the shock without the user's command. Semi-automatic models will tell the user that a shock is needed, but the user must tell the machine to do so, usually by pressing a button. In most circumstances, the user cannot override a "no shock" advisory by an AED. Some AEDs may be used on children - those under 55 lbs (25 kg) in weight or under age 8. If a particular model of AED is approved for pediatric use, all that is required is the use of more appropriate pads.

All AEDs approved for use in the United States use an electronic voice to prompt users through each step. Because the user of an AED may be hearing impaired, many AEDs now include visual prompts as well. Most units are designed for use by non-medical operators. Their ease of use has given rise to the notion of public access defibrillation (PAD), which experts agree has the potential to be the single greatest advance in the treatment of out-of-hospital cardiac arrest since the invention of CPR.<sup>[19]</sup>



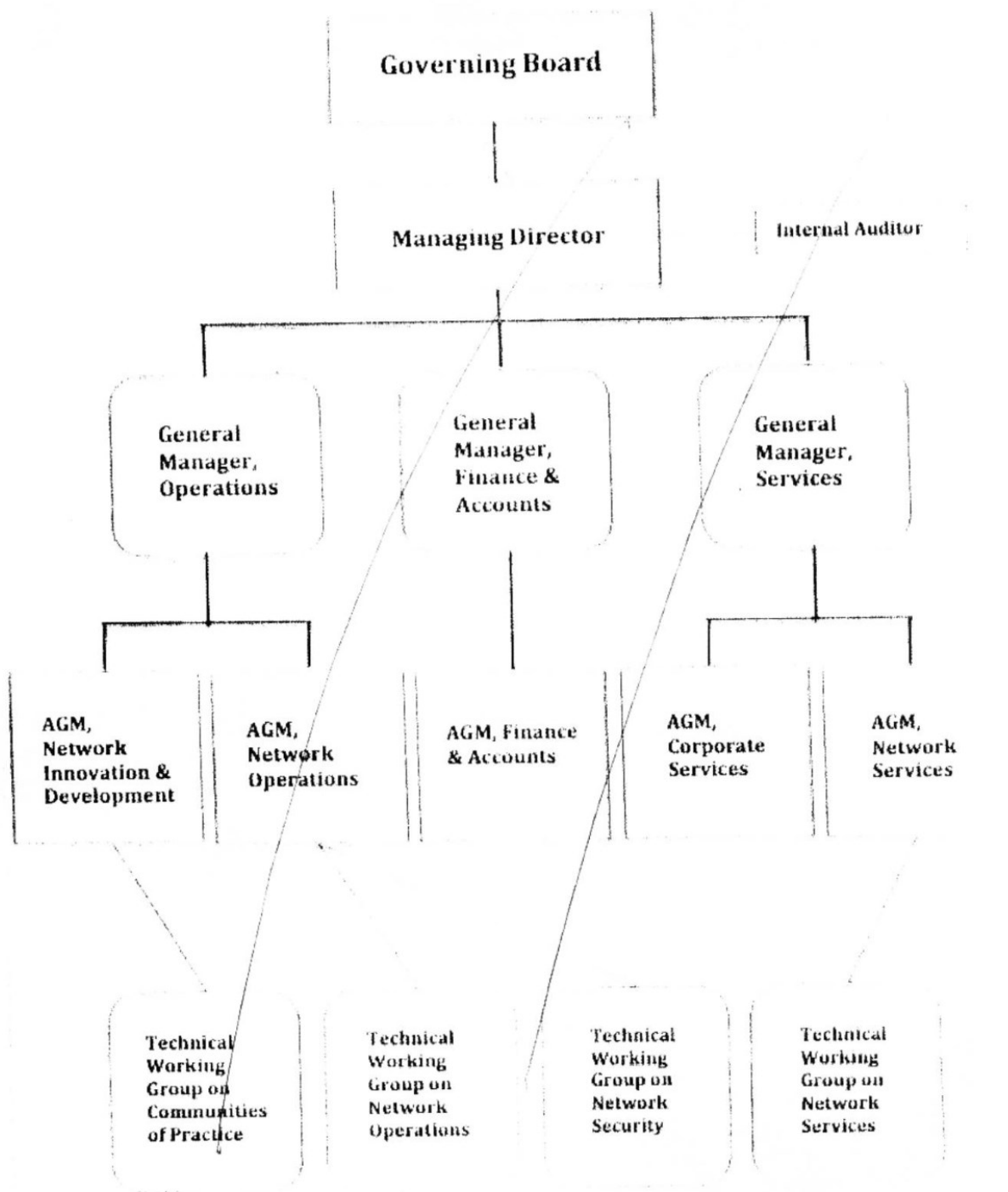
Usual placement of pads on chest

The number of people who survive sudden cardiac arrest is increasing gradually, thanks to the use of AEDs. For this reason, the Sudden Cardiac Arrest Foundation developed the National SCA Survivor Network (<http://www.sca-aware.org/national-sca-survivor-network>), which provides a platform for mutual support and for engaging in the mission to help save other lives.

## Liability

Automated external defibrillators are now easy enough to use that most states in the United States include the "good faith" use of an AED by any person under Good Samaritan laws.<sup>[20]</sup> "Good faith" protection under a Good Samaritan law means that a volunteer responder (not acting as a part of one's occupation) cannot be held civilly liable for the harm or death of a victim by providing improper or inadequate care, given that the harm or death was not intentional and the responder was acting within the limits of their training and in good faith. In the United States, Good Samaritan laws provide some protection for the use of AEDs by trained and untrained responders.<sup>[21]</sup> AEDs create little liability if used correctly;<sup>[22]</sup> NREMT-B and many state Emergency Medical Technician (EMT) training and many CPR classes incorporate or offer AED education as a part of their program. In addition to Good Samaritan laws, Ontario, Canada also has the "Chase McEachern Act (Heart Defibrillator Civil Liability), 2007 (Bill 171 – Subsection N)", passed in June, 2007,<sup>[23]</sup> which protects individuals from liability for damages that may occur from their use of an AED to save someone's life at the immediate scene of an emergency unless damages are caused by gross negligence.

## Reliability



## How it all started

In recognition of the critical role that research and education plays in the development path of an education system, and indeed a nation state, the National Universities Commission (NUC) in partnership with the Committee of Vice Chancellors of Nigerian Universities, CVC, sought to establish a foundation that would ensure universities could communicate, collaborate, access and share resources across national and international boundaries, primarily for the purpose of research and learning but with added capabilities to offer the efficiencies of unified communications and consolidation of digital content.

To ensure that the project benefitted from a clear roadmap with defined milestones and measurable outcomes, the NUC set up a team with membership from her technical staff and from some universities in addition to engaging consultants (one National and one



# How To Survive Heart Attack Alone

Let's say it's 7.25 pm and you're going home (alone if course) after an unusually hard day on the job.



**Y**ou're really tired, upset and frustrated. Suddenly, you start experiencing severe pain in your chest that starts to drag out into your arm and up in to your jaw. You are only about five km from the hospital nearest to your home.

Unfortunately, you don't know if you'll be able to make it that far. You have been trained in CPR, but the guy that taught the course did not tell you how to perform it on yourself.

Since many people are alone when they suffer heart attack without help, the person whose heart is beating improperly and who begins to feel faint, has only about 10 seconds left before losing consciousness. However, these victims can help themselves by coughing repeatedly and very vigorously.

**A deep breath should be taken before each cough, and the cough must be deep and prolonged, as when producing sputum from deep inside the chest. A breath and a cough must be repeated about every two seconds without let-up until help arrives, or until the heart is felt to be beating normally again.**

Deep breaths get oxygen into the lungs and coughing movements squeeze the heart and keep the blood circulating. The squeezing pressure on the heart also helps it regain normal rhythm. In this way, heart attack victims can get to a hospital.

## Know the danger zones

Being aware of these high-risk windows might lead you to tweak your lifestyle and your chance of problems.

## A bout of flu

As if extreme exhaustion, achiness, and high fever weren't bad enough, the flu may quadruple your odds of having a heart attack for up to three days following the illness. The virus may trigger an inflammatory response that can damage arteries. Being dehydrated thickens blood, making it prone to clot. A fever can increase your heart rate, forcing the heart to work harder. A few days after

## A big sporting event

Believe it or not, even cheering for your team can break your heart -- if you get so wrapped up in the game that your emotions spiral out of control. Soccer's World Cup is serious business in Brazil. When researchers studied four Cups' worth of data, they found that heart attacks increased during the tournament's finals and rates were highest when Brazil was playing compared with other teams. If you're a screaming sports fan, you could ask your doctor about taking a daily baby aspirin. Better yet, try to take things down a notch.

## A manic Monday

Sunday-night blues make your heart sad too. A day-by-day breakdown of the incidence of heart attacks reveals that attacks spike on the days when we return to work after a break. Stress over the coming workweek raises levels of adrenaline and cortisol, which may increase blood pressure and clotting. Starting the week on a calmer note with even five to ten minutes of morning yoga or meditation has helped my patients. Walking at lunch to relieve midday stress is

another good idea.

## Shoveling snow

The cardiac stress of cold weather and heavy labor can be extreme. In case studies, researchers have described heart attacks in patients who suffered a clot in a previously placed heart stent during or soon after shoveling snow. (We've seen similar heart attack risks in hunter's dragging game out of cold fields.) I tell my patients with heart disease to dress warmly, take frequent breaks, stay hydrated, and, in some cases, just play it safe and leave shoveling to someone else.

## The death of a loved one

Researchers who analyzed thousands of U.S. heart attack victims found that those grieving a death were more likely to have an increased heart attack risk in the week following their loved one's passing. Swedish research found that the heart attack risk remains elevated for several years after the death of an adult sibling. If you are suffering from a loss and feel alone or depressed, seek out counseling and support from your doctor, friends, and family. Don't sit home alone and suffer.

## A devastating natural disaster

In the three weeks following the 8.9-magnitude earthquake and accompanying tsunami that killed thousands of people in Japan in 2011, the rate of heart attacks among survivors increased threefold, compared with the rate during the same calendar weeks in past years. It's important for first responders and health-care providers to be aware of this.

