General Disclaimer

One or more of the Following Statements may affect this Document

- This document has been reproduced from the best copy furnished by the organizational source. It is being released in the interest of making available as much information as possible.

- This document may contain data, which exceeds the sheet parameters. It was furnished in this condition by the organizational source and is the best copy available.

- This document may contain tone-on-tone or color graphs, charts and/or pictures, which have been reproduced in black and white.

- This document is paginated as submitted by the original source.

- Portions of this document are not fully legible due to the historical nature of some of the material. However, it is the best reproduction available from the original submission.

Produced by the NASA Center for Aerospace Information (CASI)
FINAL REPORT
SKYLAB IMSS CHECKLIST
APPLICATION STUDY
FOR
EMERGENCY MEDICAL CARE

AUGUST 15, 1975

PREPARED BY
GENERAL ELECTRIC
HOUSTON OPERATIONS
HOUSTON, TEXAS
This report presents the findings and data products developed during the project to apply Skylab Inflight Medical Support System (IMSS) Checklist data concepts to Emergency Medical Care delivery functions. This project was performed by General Electric-Houston Operations for the NASA, Lyndon B. Johnson Space Center under Contract NAS 9-14442. The Technical Monitor for this study was Charles K. LaPinta, M.D., Bioengineering Systems Division-Life Sciences Directorate of NASA-JSC.

The principal product developed during this project was the:


This manual was developed in cooperation with the NASA-JSC Bioengineering Systems Division, the Houston Fire Department and the City of Houston Health Department Emergency Medical Services group. This document was developed after detailed review of recent documentation on Emergency Medical Care, State of Texas curriculum requirements in this area, Telecare Unit Operations Manual, and Houston Fire Department and the City of Houston Health Department operating procedures, practices and facilities.
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0</td>
<td>INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>2.0</td>
<td>SUMMARY OF RESULTS</td>
<td>2</td>
</tr>
<tr>
<td>3.0</td>
<td>RECOMMENDATIONS FOR FUTURE STUDIES</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>REFERENCES</td>
<td>7</td>
</tr>
</tbody>
</table>
1.0 INTRODUCTION

This report presents the findings and the data products developed during the project to apply Skylab Inflight Medical Support Systems (IMSS) Checklist data concepts to Emergency Medical Care delivery functions. This project was performed by the General Electric Company, Space Division, Technical and Support Services Department—Houston Operations under Contract NAS 9-14442 to the NASA-Lyndon B. Johnson Space Center. The purpose of this study was to provide an Emergency Medical Care manual that would support the operations of the Portable Ambulance Module (PAM), developed jointly by NASA-JSC and Telecare Inc., and now being used by the Houston Fire Department in delivering Emergency Medical Care services. The project was performed for the Life Sciences Directorate (LSD), Bioengineering Systems Division. The Technical Monitor for the project was Charles K. LaPinta, M.D. He was assisted in this effort by Joe L. Day of the Systems Development Branch.

The project was also supported by:

Houston Fire Department Personnel
- Chief L. O. Martin
- Mr. C. L. Wilford

City of Houston Health Dept., Emergency Medical Services Personnel
- Lowel B. Baker, M.D.
- Mr. Randal Burtin
- Ms. Linda O'Grady

In addition, Mr. T. C. Simons of General Electric, who is presently an EMT instructor in the LaPorte/Bayshore Emergency Squad, supplied invaluable assistance in support of this project.
2.0 SUMMARY OF RESULTS

The results and the documentation product of the General Electric - Houston Operations project to apply Skylab IMSS Checklist Data concepts to Emergency Medical Care functions are presented in the following paragraphs of this and subsequent sections of this report.

The major purpose of this project was to publish a document that could be used by the Houston, Texas Fire Department Emergency Medical Technician group in their work with emergency victims in and around the City of Houston. In particular the manual was to provide medical and engineering documents to support those Emergency Medical Care operations that involved the use and operation of the Portable Ambulance Module (PAM) developed by NASA/JSC and Telecare, Inc. (a Company formed from SCI, Inc., the original developers).

The Telecare I Unit is carried on all ambulances of the Houston Fire Department as a Portable Ambulance Module and is designed to be used by Emergency Medical Technicians for emergency resuscitation and victim monitoring. The unit contains 2-way voice communications capability and can transmit EKG data simultaneously to the base station from a victim connected to the unit. The capability to defibrillate a cardiac victim also is provided as well as stowage space for resuscitation equipment (portable Aspirator, lightweight solid-state oxygen generator, Resusci-bag and airways.)

The PAM Operations and Emergency Care support manual developed in this project and presented in Appendix A of this report was designed to provide the basic technical documentation to support the operation and utilization of this unit in the field. After surveying the engineering information available on the unit and training courses being utilized by City Health and Fire Department training groups, it was established that the initial need was for accurate, yet simple definitions of the functions of all the controls, displays, and stowed equipment of the unit.
Section I of the manual was developed to provide a general description of the functions and capabilities of the PAM (Telecare I) Unit and identifying nomenclature and codes for all displays, controls, and stowed equipment. These unique equipment codes are then used throughout the manual when referring to a specific element of this equipment. These codes are used in the operating procedures documentation as well as in discussions about the usage of these controls in delivering emergency medical care.

Of particular importance to the EMT is a thorough understanding of what occurs when controls and switches of the PAM unit are placed in the various operating positions. Specifically, a detailed knowledge of the various operating modes of the communications equipment and their relationship to the base station, dispatcher, ambulance, and walkie-talkie communications equipment is necessary. In addition, the information transmitted in the various communication modes (e.g., EKG and voice) must also be understood along with the detailed operating sequences and tasks required to utilize the equipment in delivering emergency care.

All of the above noted equipment information required for operations of the PAM (Telecare I) unit is included in Section I of the manual (Pages 1-1 through 1-24 of Appendix A). The information in Section I is arranged for optimum convenience of the user of the manual and provides definitive operating procedures for all the PAM (Telecare I) equipment.

The EMT, in addition to the basic equipment operating information contained in Section I, also requires knowledge of basic physiological information and of step-by-step actions that are necessary in performing emergency care delivery. Sections II, III, and IV of the manual provide supportive medical and physiological data in those areas that are directly related to uses of the PAM (Telecare I) Unit.
Section II (Pages 2-1 through 2-6, Appendix A) of the manual was developed to provide background information on respiration and resuscitation methods. This section in conjunction with resuscitation equipment operating information from Section I should provide a basic orientation for the EMT to the major priority areas of Emergency Medical Care. Section III (Pages 3-1 through 3-22, Appendix A) of the manual is designed to provide an in-depth orientation of the cardiovascular system, the heart pump, and the monitoring of the heart activity through the use of the Electrocardiogram. A detailed discussion of heart arrhythmias is also included to provide a basis for understanding the recommended EMT pre-hospital treatment actions and protocols that are also defined. These procedures all recognize the requirement that the EMT must follow directions provided by the duty physician at the base hospital (Ben Taub in Houston, Texas). In providing emergency care for cardiac and shock victims, a major resource available to the advanced EMT is the capability to give intravenous (IV) fluids and selected drugs in compliance with directions of the base physician.

Section IV of the manual provides the EMT with background information on those drugs presently carried and utilized by the Houston Fire Department in their delivery of emergency medical care. General procedures for establishing IV's and administering drugs are also provided to support the actions of the advanced EMT's in providing this care.

Sections V through VII of the manual provide supplementary information to assist the EMT in aspects of the emergency care delivery process other than those directly related to the usage of the PAM Unit. Section V contains information designed to assist the EMT in his approach to the emergency scene by providing an overview of the major types of emergencies that the EMT will be required to deal with in performing his duties as well as summary data on the victim's signs, symptoms, and their interpretation.

Section V also contains a unique approach to the problem of providing the EMT with the protocol he should follow in dealing with accident and medical emergency
situations and related criteria that will assist him in making the logical decisions required. Logic diagrams are provided for the sorting of multiple victims (triage) and for basic emergency care procedures.

Sections VI and VII contain more detailed EMT protocol and procedures that are recommended for emergency care associated with trauma/injury and medical emergencies.

Section VIII of the PAM Operations and Emergency Care manual is specifically related to the basic inventory of emergency medical care supplies that are maintained by the Houston Fire Department and a recommended location coding system for one type of ambulance (Modulance SA 138) utilized by the HFD. This coding system was devised to provide a simplified method for referring to equipment and of training EMT's in a recommended standard configuration to be maintained by EMT crews. Maintenance of a standard configuration for each type of ambulance, so that crews can shift from one type to another without lengthy orientation periods, is highly desirable. The present recommended system of location coding can be of assistance in this process.
3.0 RECOMMENDATIONS FOR FUTURE STUDIES

The project to develop the PAM Operations and Emergency Care Manual has resulted in a manual that should be of value to those EMT's and EMT instructors who must learn to operate and utilize the Portable Ambulance Module (Telecare 1) in providing emergency care delivery. In addition, it provides general physiological and medical information that can be of assistance in training the EMT and Advanced EMT in their total responsibilities.

In developing this manual for NASA, GE-Houston Operations has applied data techniques utilized in the Skylab Inflight Medical Support System (IMSS) Checklist and has expanded these techniques with new forms of procedural logic and supporting training and operational data. During the course of this PAM manual project, a distinct need was expressed by a multiple-amputee victim for similar definitive procedural documentation to assist such victims in their rehabilitation training. It appears that this PAM type of operations documentation is especially suited to the need of such victims. This area of training data for multiple amputees should be considered by NASA as a candidate area for future applications projects of these Skylab IMSS Checklist and PAM Operations and Emergency Care data concepts.

The PAM manual is the first technical application study of the Skylab IMSS Checklist concepts in the Emergency Care area. It is closely associated with the Telecare 1 ambulance module. New models of this Unit are presently being marketed and are scheduled for usage by the Houston Fire Department and other emergency care groups throughout the nation. Updates, particularly of Section I, of the present manual will be necessary if this type documentation is to be utilized to support training and usage of these new units.
REFERENCES

1. American Heart Association; Standards for Cardiopulmonary Resuscitation (CPR) and Emergency Cardiac Care (ECC); 1973.


4. Division of Vocational Education, State Department of Education, Columbus, Ohio; Emergency Victim Care; 1973.

5. Dubin, Dale; Rapid Interpretation of EKG's; Cover Publishing Company, 1974.


11. Texas State Department of Health, Division of Emergency Medical Services; Lesson Plans and Lectures.

PORTABLE
AMBULANCE MODULE
OPERATIONS
AND
EMERGENCY CARE
MANUAL

This manual was prepared under Contract NAS 9-14442
for the
National Aeronautics and Space Administration
Johnson Space Center
Houston, Texas
INTRODUCTION

This manual or handbook has been prepared for the National Aeronautics and Space Administration as a supporting document for the NASA-developed Portable Ambulance Module (PAM).

SECTION I CONTAINS:

A general verbal description of the systems of the PAM

- Graphic illustrations and coding of the PAM Controls/Displays and Stowed Equipment. All items contained in the unit are identified with alphabetical codes (LTR) which are used throughout the manual to refer to that particular equipment item. These illustrations are presented on fold-out pages such that they may be viewed simultaneously with the detailed discussion data that follows.

- General Operating Procedures for the PAM.

- Detailed Discussions of the Operations of each individual item of PAM Equipment. The discussions are arranged in alphabetical sequence of equipment reference codes, (A), (B), (C), ..., following the graphic illustrations such that each detailed discussion can be viewed simultaneously with the illustration of the equipment.

Sections II thru VII of the Manual contain background physiological and procedural information to support Emergency Health Care delivery training for the Houston, Texas Fire Department as follows:

SECTION II - Respiration-Resuscitation (CPR)
SECTION III - Emergency Cardiac Care
SECTION IV - Drugs and IV's
SECTION V - General Approach to Emergency Victims
SECTION VI - Trauma/Injury
SECTION VII - Medical Emergencies

The last section of the manual (Section VIII) shows a recommended system of location of equipment for one configuration of the Modulance Type SA-138 Ambulance used by the Houston Fire Department.
# Table of Contents

**SECTION I PORTABLE AMBULANCE MODULE (PAM)**
- PAM DESCRIPTION .................................................. 1-1
- REFERENCE CODES FOR PAM CONTROLS AND DISPLAYS, AND STOWED EQUIPMENT ........................................ 1-5
- PAM OPERATIONAL PROCEDURES ................................... 1-6
- PAM TRANSMIT MODE/SWITCH POSITION MATRIX ................ 1-7
- PAM AMBULANCE /BASE STATION COMMUNICATIONS ............... 1-7
- CONTROL/DISPLAYS (C/D) FUNCTION DESCRIPTION:
  - Communications C/D's ......................................... 1-8
  - Additional Voice-Communication Capabilities ............... 1-9
  - Telephone Coupler ............................................. 1-9
  - Headset/Mike .................................................. 1-9
  - Power C/D's .................................................... 1-10
    - Charging PAM ................................................. 1-10
    - EKG
      - EKG Hardware Function .................................... 1-11
      - EKG C/D's .................................................. 1-12
      - EKG Discussion ............................................ 1-13
    - Defibrillation Discussion .................................. 1-15
      - Defibrillation C/D's ...................................... 1-16
    - Blood Pressure C/D's ....................................... 1-18
    - PAM Resuscitation Equipment ................................ 1-20
      - Emergency Oxygen System .................................. 1-21
      - Emergency Oxygen Procedures ............................ 1-22
      - Airways ..................................................... 1-23
      - Airbag ....................................................... 1-24
      - Aspirator Procedures ...................................... 1-25

**SECTION II RESPIRATION-RESUSCITATION-CPR**
- LUNG RESPIRATION DISCUSSION .................................... 2-1
- RESPIRATION ....................................................... 2-2
- RESPIRATION DIFFICULTIES AND BASIC LIFE SUPPORT ............ 2-3
- BASIC CARDIO PULMONARY RESUSCITATION (CPR) .................. 2-4
- 1-MAN CPR ........................................................ 2-5
- 2-MAN CPR ........................................................ 2-6
## TABLE OF CONTENTS (Continued)

### SECTION III EMERGENCY CARDIAC CARE
- CARDIOVASCULAR SYSTEM ........................................ 3-1
- HEART ANATOMY AND PHYSIOLOGY .............................. 3-3
- ELECTRICAL ACTIVITY OF THE HEART ......................... 3-4
- NERVOUS CONTROL OF THE HEART ............................ 3-5
- ELECTROCARDIOGRAM ........................................... 3-7
- CARDIAC EVENTS .................................................. 3-9
- EKG SEGMENT DISCUSSION ...................................... 3-10
- EKG EMT EVALUATION ELEMENTS ............................. 3-12
- CARDIAC VICTIM'S DIAGNOSTIC SIGNS AND SYMPTOMS .... 3-13
- EKG EFFECTS OF PATHOLOGICAL CONDITIONS ............... 3-14
- ARRYTHMIA DISCUSSION ........................................ 3-15
- ARRYTHMIAS ....................................................... 3-16
- RECOMMENDED PRE-HOSPITAL TREATMENTS .................. 3-17
- ARRYTHMIA SUMMARY INDEX .................................. 3-22

### SECTION IV IV-DRUGS
- IV DRUGS AND EQUIPMENT ....................................... 4-1
- SYRINGE PROCEDURES ............................................ 4-1
- IV PROCEDURES ................................................... 4-2
- DRUG/IV FLUID DATA ............................................. 4-6
- DRUG EFFECTS ON HEART RATE AND BLOOD PRESSURE ....... 4-10

### SECTION V APPROACH-TO-SCENE
- TYPES OF EMERGENCIES AND EMT ACTIONS ................... 5-1
- VICTIM SIGNS AND SYMPTOMS .................................. 5-2
- BASIC EMERGENCY CARE PRIORITIES FOR THE INDIVIDUAL  VICTIM ......................................................... 5-3
- CRITERIA AND LOGIC FOR TRIAGE ............................ 5-5
- GENERAL EMERGENCY CARE PROCEDURAL LOGIC ............ 5-6
- "IMPACT" EMERGENCY CARE PROCEDURAL LOGIC ............. 5-7
- SINGLE VICTIM EMERGENCY CARE PROCEDURAL LOGIC ........ 5-8
# TABLE OF CONTENTS (Continued)

<table>
<thead>
<tr>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SECTION VI TRAUMA/INJURY</strong></td>
<td></td>
</tr>
<tr>
<td>• MUSCULOSKELETAL DISCUSSION</td>
<td>6-1</td>
</tr>
<tr>
<td>• MUSCULOSKELETAL INJURIES</td>
<td>6-2</td>
</tr>
<tr>
<td>• SPLINTS/SPLINTING</td>
<td>6-3</td>
</tr>
<tr>
<td>• WOUNDS-DRESSINGS/BANDAGES</td>
<td>6-5</td>
</tr>
<tr>
<td>• CONTROL OF BLEEDING</td>
<td>6-6</td>
</tr>
<tr>
<td>• BANDAGING</td>
<td>6-7</td>
</tr>
<tr>
<td>• SKIN BURNS</td>
<td>6-9</td>
</tr>
<tr>
<td>• EMERGENCY CARE FOR BURNS</td>
<td>6-10</td>
</tr>
<tr>
<td>• BRAIN AND SKULL INJURIES</td>
<td>6-11</td>
</tr>
<tr>
<td><strong>SECTION VII MEDICAL EMERGENCIES</strong></td>
<td></td>
</tr>
<tr>
<td>• MEDICAL EMERGENCIES</td>
<td>7-1</td>
</tr>
<tr>
<td>• SHOCK</td>
<td>7-2</td>
</tr>
<tr>
<td>• POISONING AND DRUG ABUSE</td>
<td>7-3</td>
</tr>
<tr>
<td>• PSYCHIATRIC</td>
<td>7-5</td>
</tr>
<tr>
<td><strong>SECTION VIII AMBULANCE STOWAGE</strong></td>
<td></td>
</tr>
<tr>
<td>• RECOMMENDED AMBULANCE STOWAGE CODE</td>
<td>8-1</td>
</tr>
<tr>
<td>• EQUIPMENT LOCATIONS</td>
<td>8-2</td>
</tr>
</tbody>
</table>
PAM DESCRIPTION

The PAM is a compact, portable unit designed for use by Emergency Medical Technicians (EMT's) and paramedical personnel for emergency resuscitation and patient monitoring. It has been designed for use in an ambulance, where it is securely locked into a floor mount, or at the scene of an acute medical situation. The unit contains its own power supply in the form of two sets of rechargeable (nickel-cadmium) batteries - one set for unit power and one for power to a Defibrillator in the unit. Both sets of batteries are charged by a DC charger installed in the ambulance and are totally integrated into the Telecare unit.

The PAM contains the following components and is delivered with the supportive equipment identified below:

1. COMMUNICATIONS

The PAM contains capability for full duplex communication in order to provide continuous and simultaneous conversation between the Base Station physician and the EMT. The system essentially provides the physician an "at the scene" capability in order to provide decisions on treatment based on medical judgement.

The electrocardiogram data from the patient and the voice data from the EMT are combined and sent simultaneously over a single frequency by a process called multiplexing. This allows for continuous uninterrupted transmission of the electrocardiogram, with voice comments as necessary by the EMT, and full return capability of voice transmission by the physician without the operation of any switches. The unit is supplied with a headset in order to free the hands of the EMT.

In order to conserve weight, a lightweight, low-powered transmitter is used to send these voice and EKG signals to the ambulance where they are amplified and retransmitted by another radio called the "ambulance repeater." The use of a mobile repeater also allows the EMT to connect electrodes to the patient.
one time and maintain full communication until the patient is delivered to
the desired destination. Thus, the physician who has been trained in the
special techniques of "in-the-field care of the patient" can provide the
necessary judgement and direction of the EMT until the patient is delivered
to the hospital emergency room.

2. **EKG**

The EKG circuit contains provisions for a three-wire differential input for
maximum noise rejection. It accepts electrodes for three (3) clinical lead
examinations (The "Limb Leads"). Standard electrodes of any commercially-
available type may be used, or the EKG can be taken from the defibrillator
paddles. EKG information is displayed on a small scope in the unit, trans-
mitted to a strip recorder in the ambulance, and relayed to the Base Station.
Electrodes and appropriate wiring are carried in the unit.

3. **DEFIBRILLATOR**

A self contained defibrillator with two paddle-type electrodes is contained in
the unit. It is capable of delivering an adjustable energy level up to 400
watt-seconds for 10 milliseconds and may be recharged in less than 12
seconds. Approximately 50 defibrillation discharges are available from a
defibrillator whose batteries are fully charged.

4. **BLOOD PRESSURE**

A semi-automatic indirect blood pressure system in available as part of the
PAM. The blood pressure system utilizes a special microphone placed
beneath a manually-inflated cuff. Electronic filters and frequency trans-
lation circuits are used to optimize the relationship of Korotkoff sound
information and background noise. The blood pressure sound information is
translated to a higher frequency tone that can be discriminated from ambient
noise by the ear. The system is usable for the special situation that occurs
in shock where the amplitude and frequency components of the blood pressure
sounds are diminished. Thus, the blood pressure system can frequently be used in many situations where there is high background noise and when the patient is severely hypotensive. For the situation in which the sounds are not discernible, due to extreme amounts of background noise, the palpatory method can be used, without revision of the basic system. The systolic and diastolic blood pressures are displayed digitally on the unit but are not transmitted to the Base Station. This information is transmitted by voice.

5. **TELEPHONE COUPLER**

A telephone acoustical coupler provides a backup means for transmitting the voice and EKG signal from the site of the emergency to the medical center over standard "dial-up" telephone circuits or by coupling to the handset of the ambulance relay transmitter.

6. **STRIP CHART RECORDER**

Telecare provides a compact strip chart recorder that is mounted in the ambulance to provide a permanent record which can be delivered with the patient on arrival at the hospital. This recorder is interfaced to the mobile repeater such that a pre-determined length of record is automatically recorded at the start of transmission for each patient.

7. **FOLDING RESUSCITATION BAG, MASKS, AND AIRWAYS**

A folding resuscitation bag with reuseable oropharyngeal airways and masks are within the storage area of the PAM.

8. **ASPIRATOR**

A portable, lightweight, freon-powered aspirator is provided as an accessory. It uses a disposable, freon-filled canister to provide for the suction removal of fluids with all necessary tubing and collection reservoir. A vacuum effect in excess of 400 mm Hg is possible at normal room temperatures.
9. **OXYGEN**

The size and weight imposed by the usual oxygen bottle in ambulances discourages its routine use outside the vehicle. The oxygen system utilizes a solid-state canister which is both lightweight and independently portable. The average rate of oxygen availability is 6 liters per minute for a minimum of 15 minutes per canister. The oxygen unit and accessory equipment for ventilation can be totally removed from the suitcase in order to provide maximum operational procedures when the patient is being cared for by several people; thus, eliminating the need for several people operating out of the same confined area around a unit. Spare canisters are carried in the ambulance.
REFERENCE CODES FOR
TELECARE CONTROLS, DISPLAYS AND STOWED EQUIPMENT

STOWED EQUIPMENT

LEFT BELL

RIGHT BELL
## Activation and Charging

### Preparation
1. Fold carrying handle towards back of unit.
2. Unfasten locks and open top of unit.
3. Unfasten locks and open left and right well doors.
4. Remove head set LF from left well and put on.

### Main Power
1. Main power switch H to ON. (This is necessary for all Telecare unit systems operations except defibrillator)
2. Light switch 1 to ON (right ops.) or OFF.
3. Verify on power display G if capacity remaining is below ________%.

### Charger
- Connect charger cable at AA.

### Transceiver (Communications)
1. Verify main power switch H on.
2. Put on headset LF.
3. Set transmitter channel selector to: A, B, C, D, or E as directed.
4. Adjust squelch B as req'd.
5. Adjust volume C as req'd.
6. Set microphone F to:
   - LOCK (normal ops.)
   - MOMENTARY (must hold)
7. Set transmitter mode switch A to:
   - EKG and Voice (normal ops.)
   - EKG or Voice
8. Set transmitter duty cycle D to:
   - CONTINUOUS (normal ops.)
   - INTERMITTENT

### EKG
1. Verify main power switch H on.
2. Remove electrodes (R) from right door and apply them as shown below:
   - RIGHT ARM
   - LEFT ARM
   - LEFT LEG
3. Remove electrode cable (E) from right well and connect electrode leads to electrodes:
   - BLACK (left arm) to “LEFT ARM”
   - WHITE (right arm) to “RIGHT ARM”
   - RED (left leg) to “LEFT LEG”
4. Check electrodes by:
   - Depressing electrode check pushbutton O.
   - If electrode light(s) P flash, the electrode indicated as bad (flashing) should be changed and rechecked.
5. Set lead selector M as directed by base station.
6. Adjust brightness control L as required by looking at display I.
7. Adjust size control X to size as desired.
8. Monitor trace on display J as required.

### Defibrillator
1. If not all time per EKG electrode:
   - EKG electrode:
2. As per area determined.
3. Remove defibrillator from right in areas.
4. Remove defibrillator from right.
5. Defibrillator:
   - Push and R to control energy level for patient.
6. Make sure and you are victim.
7. Place pad as shown:
8. Proceed sequence.
9. Depress simultaneously.
10. Remove power monitor E.
11. For addition repeat S.
12. If defibrillator completes:
   - Hold charge.
   - Drain unit reads 2.
13. Defibrillator last def.
**TELECARE UNIT OPERATIONAL PROCEDURES**

### PATIENT EXAMINATION AND EMERGENCY PROCEDURES

#### EKG
1. **VERIFY MAIN POWER SWITCH** to **ON**.
2. **REMOVE ELECTRODES** from **RIGHT DOOR** and apply them as shown below:
   - **RIGHT ARM**
   - **LEFT ARM**
   - **LEFT LEG**
3. **REMOVE ELECTRODE CABLE** from **RIGHT WELL** and connect electrode leads to electrodes:
   - **BLACK (LEFT ARM)** to "LEFT ARM"
   - **WHITE (RIGHT ARM)** to "RIGHT ARM"
   - **RED (LEFT LEG)** to "LEFT LEG"
4. **CHECK ELECTRODES** by:
   - Depress electrode check pushbutton.
   - If electrode light(s) flash, the electrode indicated as "BAD" (FLASHING) should be changed and rechecked.
5. **SET LEAD SELECTOR** as directed by base station.
6. **ADJUST BRIGHTNESS CONTROL** as required by looking at display.
7. **ADJUST SIZE CONTROL** to size as desired.
8. **MONITOR TRACE ON DISPLAY** as required.

#### DEFIBRILLATOR
1. **IF NOT ALREADY CONNECTED, AND IF TIME PERMITS, APPLY AND CONNECT EKG ELECTRODES TO VICTIM AS PER EKG PROCEDURES.**
2. **AS PER ACCEPTED PROCEDURES, DETERMINE NEED FOR DEFIBRILLATION.**
3. **REMOVE DEFIBRILLATOR JELLY** from **RIGHT DOOR** and rub on victim in areas shown in step.
4. **REMOVE DEFIBRILLATOR PADDLES** from **RIGHT WELL.**
5. **DEFIBRILLATOR SWITCH** to **ON.**
6. **PUSH AND HOLD CHARGE/DRAIN SWITCH** to charge until delivered energy **REACHES REQUIRED ENERGY LEVEL FOR VICTIM DEFIBRILLATION.**
7. **MAKE SURE ALL PERSONNEL ARE CLEAR AND YOU ARE NOT IN CONTACT WITH VICTIM.**
8. **PLACE PADDLES FIRMLY ON VICTIM AS SHOWN:**
9. **DEPRESS PADDLE PUSHBUTTTONS SIMULTANEOUSLY.**
10. **REMOVE PADDLES FROM VICTIM AND MONITOR EKG** for conversion.
11. **FOR ADDITIONAL DEFIBRILLATIONS, REPEAT STEPS THROUGH.**
12. **IF DEFIBRILLATOR IS CHARGED AFTER COMPLETING PROCEDURE, PUSH AND HOLD CHARGE/DRAIN SWITCH TO DRAIN UNTIL DELIVERED ENERGY READS ZERO.**
13. **DEFIBRILLATOR SWITCH** to **OFF** after last defibrillation.
14. **STOW PADDLES IN RIGHT WELL.**

#### BLOOD PRESSURE
1. **VERIFY MAIN POWER SWITCH** to **ON.**
2. **REMOVE CUFF UNIT** from **RIGHT DOOR**, and plug mike and air hose into receptacles in right well.
3. **BLOOD PRESSURE SWITCH** to **ON.**
   - **TONE WILL BE HEARD IN HEADSET.**
4. **INSTALL CUFF UNIT ON VICTIM'S ARM:**
   - Mike over brachial artery
   - Cuff wrapped snugly
5. **CLOSE BULB AIR VALVE**.
6. **DEPRESS AND RELEASE START BUTTON**.
7. **PUMP CUFF UP TO 200 mm Hg.**
8. **OPEN BULB AIR VALVE** very slightly to get a B/P drop of approximately 3 mm/sec.
9. **DEPRESS SOUNDS BUTTON** when first "BEAT" sound is heard, (this locks systolic B/P display. This "BEAT" sound is higher than continuous tone.).
10. **RELEASE SOUNDS BUTTON** when last beat sound is heard. (This locks diastolic display for reading of diastolic pressure.)
11. **REPORT AND/OR RECORD B/P READINGS AS REQUIRED.**
12. **REPEAT STEPS THROUGH FOR ADDITIONAL READINGS. WAIT TWO MINUTES BETWEEN READINGS.**
13. **BLOOD PRESSURE SWITCH** to **OFF** when completed.
14. **REMOVE CUFF** and stow.

---

1-6
TELECARE CONTROLS, DISPLAYS AND STOWED EQUIPMENT

TRANSCIEVER
- ANTENNA
- EKG AND VOICE
- EKG OR VOICE
- SPEAKER/SQUELCH VOLUME

OXYGEN
- BB
- AA

CHARGER
- MAIN
- DEFIB
- FAST CHARGE
- LIGHT

BLOOD PRESSURE
- SYSTOLIC
- DIASTOLIC
- SOUNDS

DEFIBRILLATOR
- DELIVERED ENERGY
- CHARGE
- DRAIN

MAIN POWER
- ON
- OFF
- LIGHT ON

DEFIB SELECT
- III
- III
- I
- STD

LEAD SELECT
- EKG

BRIGHTNESS
- SIZE

CALIBRATE
- EKG

AC ADAPTORS
- EKG LEAD ELECTRODE
- RR IGNITION SELECT
- CHECK
- MICROPHONE
- DEFIB.
- LOCK

MICROPHONE CHECK
- SIZE
- CALIBRATE

TELECARE 1

STOWED EQUIPMENT

RIGHT ANGLE MASK ADAPTER
- AIRWAY
- RESUSCITATION BAG
- MASK

TELEPHONE COUPLER
- EKG CABLE PLUG
- B/P CONNECTOR
- EKG CABLE CONNECTOR
- ADDITIONAL ELECTRODES
- EKG CABLE

DEFIBRILLATOR PADDLES
- EKG CABLE PLUG
- B/P CONNECTOR
- EKG CABLE CONNECTOR
- ADDITIONAL ELECTRODES
- EKG JELLY
- EKG CABLE

BLOOD PRESSURE CUFF
- B/P BULB
- SNAPS
- ELECTRODES

ASPIRATOR
- TELEPHONE CABLE
- B/P BULB
- EKG CABLE

LEFT BELL

RIGHT BELL
### Telecare I Transmit Mode/Switch Position Matrix

<table>
<thead>
<tr>
<th>SWITCH</th>
<th>MAIN POWER</th>
<th>CHANNEL SELECT</th>
<th>TRANSMITTER</th>
<th>MODE</th>
<th>MICROPHONE</th>
<th>LEAD SELECT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ON</td>
<td>A, B, C, D, or E AS DIRECTED</td>
<td>CONTINUOUS</td>
<td>EKG OR VOICE</td>
<td>LOCK</td>
<td>I, II, or III</td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>A, B, C, D, or E AS DIRECTED</td>
<td>CONTINUOUS</td>
<td>EKG OR VOICE</td>
<td>OFF</td>
<td>I, II, or III</td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>A, B, C, D, or E AS DIRECTED</td>
<td>CONTINUOUS</td>
<td>EKG OR VOICE</td>
<td>OFF</td>
<td>I, II, or III</td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>A, B, C, D, or E AS DIRECTED</td>
<td>CONTINUOUS</td>
<td>EKG OR VOICE</td>
<td>OFF</td>
<td>I, II, or III</td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>A, B, C, D, or E AS DIRECTED</td>
<td>CONTINUOUS</td>
<td>EKG OR VOICE</td>
<td>OFF</td>
<td>I, II, or III</td>
</tr>
<tr>
<td></td>
<td>ON</td>
<td>A, B, C, D, or E AS DIRECTED</td>
<td>CONTINUOUS</td>
<td>EKG OR VOICE</td>
<td>OFF</td>
<td>I, II, or III</td>
</tr>
</tbody>
</table>

* "DEFIB" MAY BE SELECTED (PADDLES THEN ACT AS ELECTRODES) INSTEAD OF I, II, or III.
* MUST BE HELD IN THIS POSITION FOR ACTIVATION.

1. MUST BE IN THIS MODE WHEN FIRST CALL IS MADE TO BASE STATION.

---

**Medical Center Console**

- Monitor Switch
- Telephone & Demultiplexer
- Speaker Switch
- Microphone
- EKG & Voice
- Phone Lines

**Telecare/Ambulance/Base Station Voice and Telemetry Interfaces**

- VOICE & EKG Relay
- VOICE & EKG
- Headset
- EMT
- Relays
- Secondary Backup Phone
- Telecare Unit
- Primary Backup
<table>
<thead>
<tr>
<th>CODE</th>
<th>CONTROL/DISPLAY</th>
<th>CONTROL POS./INDICATOR</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>(TRANSMITTER) MODE SELECT</td>
<td>EKG AND VOICE</td>
<td>Voice and EKG are transmitted simultaneously. (Must be in this position for first transmission to Base Station to activate alarm system)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>EKG OR VOICE</td>
<td>EKG is interrupted during voice transmissions. (Should be used when EKG not transmitted)</td>
</tr>
<tr>
<td>B</td>
<td>SQUELCH</td>
<td>UP</td>
<td>Enables carrier squelch and allows adjustment (clockwise or counterclockwise until &quot;quiet point&quot; is reached in both headset and speaker.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DOWN</td>
<td>Enables tone squelch which requires no adjustment. Rotary function is not operative.</td>
</tr>
<tr>
<td>C</td>
<td>SPEAKER/VOLUME</td>
<td>UP</td>
<td>Adjusts both speaker and headset earphone volume.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DOWN</td>
<td>Adjusts headset earphone volume only.</td>
</tr>
<tr>
<td>D</td>
<td>TRANSMITTER</td>
<td>TRANSMITTER CONTINUOUS</td>
<td>Transmitter is &quot;ON&quot; continuously.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF</td>
<td>Turns transmitter OFF.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>INTERMITTENT</td>
<td>Transmitter is ON only when microphone switch is held in &quot;MOMENTARY.&quot;</td>
</tr>
<tr>
<td>E</td>
<td>CHANNEL (XMTR. ONLY)</td>
<td>CHANNEL A, B, C, D, E</td>
<td>Selects transmitter channel A, B, C, D, or E.</td>
</tr>
<tr>
<td></td>
<td>MICROPHONE</td>
<td>MICROPHONE LOCK</td>
<td>Microphone is &quot;hot&quot; (ON) continuously.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OFF</td>
<td>No transmissions may be made with headset mike.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MOMENTARY</td>
<td>Voice transmissions occur only when switch is held in &quot;MOMENTARY.&quot;</td>
</tr>
</tbody>
</table>

**NOTE:**
See LF for Telephone Coupler function description
See LF for Headset function description
ADDITIONAL VOICE COMMUNICATIONS CAPABILITIES

BASE STATION
(CHANNELS F6, F7, AND F8)

HFD DISPATCHER
CHANNELS:
F6 - PRIMARY
F7 - SECONDARY

AMBLANCE
(CHANNELS F6, F7, AND F8)

WALKIE TALKIE
(CHANNELS F6, F7, AND F8)

NOTE: THERE IS NO RELAY CAPABILITY USING THIS SYSTEM.

LE TELEPHONE COUPLER

BACK-UP COMMUNICATIONS FROM TELECARE UNIT TO BASE STATION VIA REGULAR (HARD-LINE) TELEPHONE COMMUNICATIONS OR AMBULANCE RELAY TRANSMITTER.

TELECARE SWITCH POSITIONS FOR COMMUNICATIONS USING COUPLER:
(a) MAIN POWER "ON"
(b) TRANSMITTER "OFF"
(c) MICROPHONE (F):
- LOCK FOR CONTINUOUS EKG AND VOICE OR
- OFF/MOMENTARY FOR CONTINUOUS EKG AND VOICE WHEN DESIRED.

AMBULANCE RELAY SWITCH POSITIONS USING COUPLER:
(a) RELAY TRANSMITTER "ON"
(b) LOCK HANDSET PUSH-TO-TALK BUTTON DOWN.
(c) VERIFY CORRECT CHANNEL

HEADSET AND MIKE
ALLOWS COMMUNICATIONS WHILE BOTH HANDS ARE FREE TO DO OTHER ESSENTIAL MANUAL OPERATIONS.

1. REMOVE COUPLER.
2. ROLL-UP RUBBER COVER.
3. UNROLL SOME LINE.
4. PLUG INTO TELECARE RECEPTACLE.
5. UNROLL ADDITIONAL LINE NECESSARY TO REACH NEAREST TELEPHONE OR AMBULANCE RELAY HANDSET.
6. DIAL BASE STATION OR SET RELAY SWITCHES TO POSITIONS NOTED ABOVE. (REPORT "COUPLER IN-USE".)
7. SLIP COUPLER OVER TELEPHONE MOUTHPIECE (MIKE).
8. VERIFY COMMUNICATIONS ESTABLISHED.
9. DESTOW HEADSET CAREFULLY SO AS NOT TO PUT STRESS ON CONNECTION TO TELECARE UNIT.
10. POSITION ON HEAD IN A POSITION FOR:
- COMFORT
- GOOD EARBUD POSITION OVER EAR FOR HEARING.
- GOOD MIKE POSITION IN FRONT OF MOUTH FOR GOOD TRANSMISSION.
<table>
<thead>
<tr>
<th>CODE</th>
<th>CONTROL/DISPLAY</th>
<th>CONTROL POS./INDICATOR</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>MAIN POWER DISPLAY</td>
<td>[Diagram]</td>
<td>Displays capacity remaining of the main battery. (Main Power, H, must be on.)</td>
</tr>
<tr>
<td>H</td>
<td>MAIN POWER</td>
<td>[Diagram]</td>
<td>Provides power to all units, except defibrillator.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Diagram]</td>
<td>Shuts off power to all units, except defibrillator.</td>
</tr>
<tr>
<td>I</td>
<td>LIGHT</td>
<td>[Diagram]</td>
<td>Light in lid is turned on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[Diagram]</td>
<td>Light in lid is turned off. (Should be left off when not needed to conserve battery)</td>
</tr>
</tbody>
</table>

**AA CHARGING TELECARE UNIT**

The batteries of the Telecare unit are of nickel/cadmium rechargeable type and in order that sufficient power is available for any emergency usage, the Telecare should be recharged when the ambulance engine is running. Therefore, when the Telecare unit is in the ambulance:

1. Connect charger cable from ambulance charging unit to Telecare receptable **AA**.
2. Verify fast charge lights **Y** and **Z** "on" when ambulance engine is running.
   (Note: If batteries are fully charged, lights will not turn on)
3. If lights do not turn on after Telecare unit has been used and you would expect fast charge to take place; verify charger switch breaker is engaged.
### EKG HARDWARE FUNCTIONS

#### BASE STATION

- **EKG HARDWARE FUNCTIONS**

- **BASE STATION**

- **EKG DISPLAY**

- **LEAD III, II, AND I**
  - EKG DISPLAY SIGNALS AS SELECTED BY SWITCH SETTING

- **TELECARE ELECTRONICS**
  - Measures and amplifies electrical voltage between pairs of electrodes and with proper lead select switch setting and communications switch settings will display on unit and transmit to base station EKG signals as follows:

- **ELECTRODES**
  - LEAD III = (L - L)
  - LEAD II = (R - L)
  - LEAD I = (R - A - L)

- **CHECKS STATUS OF TELECARE SYSTEMS AND SENDS CONTINUOUS CALIBRATED SIGNAL TO BASE ON SELECTED LEAD I OR II**

- **COMMUNICATIONS ELECTRODES SWITCHES SET FOR EKG TRANSMISSION, AS REQUIRED**

- **COMMUNICATIONS DATA ON PAGE**

### EKG OPERATING MODES

<table>
<thead>
<tr>
<th>Mode</th>
<th>Victim</th>
<th>Telecare Unit Control Settings</th>
</tr>
</thead>
</table>
| 1 | NORMAL OPs | **VICTIM**  
RAJ LLA  
MLA | **EKG DISPLAY**  
COMMUN. SET FOR EKG TRANSMIT  
EKG TRANSMITTED TO BASE STATION |
| 2 | ELECTRODE CHECK | **MAIN POWER** ON  
**EKG LED/SELECT** “OF II, OR III”  
**EKG LIGHTS**  
**COMMUN. SET FOR EKG TRANSMIT**  
**PURPOSE OF THIS MODE: TO MEASURE CONTINUITY THRU ELECTRODES, WIRES, CABLE & LIGHT(S) FLASH TO INDICATE CIRCUIT DISCONTINUITY.** |
| 3 | CALIBRATE | **MAIN POWER** ON  
**LEAD SELECT** “STD”  
**COMMUN. SET FOR EKG TRANSMIT**  
**CALIBR. BUTTON**  
**TRANSMITS CALIBRATE SIGNAL TO BASE STATION WHEN CALIB. BUTTON PUSHED AND RELEASED.** |
| 4 | SNAPS (CALIBRATION AND SYSTEM VERIFICATION) | **MAIN POWER** ON  
**LLAD SELECT I OR II**  
**COMMUN. SET FOR EKG TRANSMIT**  
**SNAPS CONNECTED TO SAME COLORED CONNECTORS**  
**TRANSMITS CONTINUOUS CALIBRATED SIGNAL TO BASE STATION AND VERIFIES TELECARE UNIT EKG ELECTRONICS SYSTEM FUNCTIONS.** |

---

**ORIGINAL PAGE IS OF POOR QUALITY**
<table>
<thead>
<tr>
<th>CODE</th>
<th>CONTROL/DISPLAY</th>
<th>CONTROL POS./INDICATOR</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>J</td>
<td>EKG DISPLAY</td>
<td></td>
<td>- Displays EKG baseline when main power switch is ON.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Displays EKG trace selected by lead select switch (M) when patient is properly connected with electrodes and leads.</td>
</tr>
<tr>
<td>K</td>
<td>EKG SIZE</td>
<td>SIZE</td>
<td>- Turning to right increases.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Turning to left decreases <strong>vertical size</strong> of trace on EKG display (J)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>NOTE:</strong> Has no effect on size of trace being received at hospital.</td>
</tr>
<tr>
<td>L</td>
<td>EKG BRIGHTNESS</td>
<td>BRIGHTNESS</td>
<td>- Turning to right increases.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Turning to left decreases <strong>brightness</strong> of EKG display (J)</td>
</tr>
<tr>
<td>M</td>
<td>EKG LEAD SELECTOR</td>
<td></td>
<td>- Takes EKG using Defibrillator paddles as electrodes and displays it on EKG display (J)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Selects lead I, II or III input, respectively from electrodes and displays it on EKG display (J)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Normal position when leads not in use. (Baseline appears on (J). Calibrate signal seen on (J) when (N) depressed)</td>
</tr>
<tr>
<td>N</td>
<td>EKG CALIBRATE</td>
<td>CALIBRATE</td>
<td>- No function.</td>
</tr>
<tr>
<td></td>
<td>BUTTON</td>
<td>PUSH DOWN</td>
<td>- Generates 1 millivolt signal that moves across EKG display (J). If communications are activated, this EKG signal is transmitted to base station and used there as a reference signal.</td>
</tr>
<tr>
<td>O</td>
<td>ELECTRODE CHECK</td>
<td>ELECTRODE CHECK</td>
<td>- No function.</td>
</tr>
<tr>
<td></td>
<td>BUTTON</td>
<td>PUSH DOWN</td>
<td>- Checks for &quot;open circuit&quot; (no signal) in EKG cable and the three electrodes and displays results on electrode display (P)</td>
</tr>
<tr>
<td>P</td>
<td>ELECTRODE LIGHTS</td>
<td></td>
<td>- Electrode lights(s) &quot;flash&quot; when electrode check button (O) is depressed and RA, LA or LL electrode, lead or EKG cable signal is absent or not properly hooked up.</td>
</tr>
</tbody>
</table>
EKG OR ECG (ELECTROCARDIOGRAM)

The total collective electrical activity associated with the waves of excitation of the heart's nerves and muscles can be recorded by electrodes placed on the skin and connected to an EKG machine. This equipment measures, records and displays this electrical activity of the heart on standard EKG graph paper (see page 3-9) that moves thru the EKG recorder at a standard rate. The resultant record is referred to as the "Patient's EKG." The record can be simultaneously displayed on a oscilloscope (cathode ray or TV type tube) as a moving display, the EKG pattern is written on the left of the display and it then moves to the right at the same rate as a written record.

Different types of EKG measurements can be made which are in essence different "views" of the heart's electrical activity from different angles around the body dependent upon the installation and connection of electrodes. The two major types of EKG's are:

- Three-Lead EKG
  - Used in pre-hospital emergency care.
  - Includes:
    3 standard bipolar (between two electrodes) measures:
    - Lead I (Right Arm-Left Arm) (RA-LA)
    - Lead II (Right Arm-Left Leg) (RA-LL)
    - Lead III (Left Arm-Left Leg) (LA-LL)
  - Measures heart activity from front of body (frontal plane)

Transmission of good quality EKG's is essential for rapid victim assessment and rapid determination of the proper pre-hospital treatment required. Factors important in this process are:

A. Good maintenance and operation of the EKG equipment
   - Proper handling and stowage of EKG equipment
   - Proper cleaning
   - Proper pre-call
     - EKG equipment checks (see page 1-11)
     - EKG battery charging operations (see page 1-10)
   - Proper control operations (see pages 1-11 and 1-12)

B. Proper body site selection for electrode installation
   - Select sites for electrode installation as illustrated.
   - Note: Women with pendulous breasts may require installation of "LL" electrode more to the side and back of the body or underneath the breast. If underneath site is selected then additional cleaning of site may be required due to excessive oil, powder and moisture that may be in that area.

C. Site preparation
   1. Cleanse all three sites thoroughly with alcohol or sterile wipes.
   2. Rub sites with gauze pad or paper towel - about 5 seconds each. (This abrading increases electrical conductivity of skin.)

D. Electrode application (electrode type - pregelled)
   1. Remove electrodes from package (open just prior to use)
   2. Apply to site (start at top edge and roll downward)
   3. Then pat entire surface of electrode

E. Connection of electrode wires to electrodes and EKG cable
   (These connections may have been accomplished previously but checks should be made for accuracy and integrity.)
   1. Connect (or verify) wire snaps (RH) to electrodes
   2. Connect or verify EKG wires (RG) to EKG cable
   3. Make sure EKG cable (RE) is connected to unit
CAUTIONS

- Do not allow tension to be placed on any of wiring connections between patient and EKG unit
  - Cable at unit
  - Cable to electrode wires
  - EKG snaps or electrodes
- String wires from patient electrodes to unit in a manner that minimizes the "over the body" stringing of the lines.

EKG UNIT NOTE: Attach clip to patient's clothing or stretcher to prevent electrode detachment.

- Keep lines from patient to EKG unit as free as possible from such things as feet, and other equipment (particularly metal type)

F. Verify EKG unit power and communications switch settings
   (1) Main power (H) on
   (2) Transmitter (D) continuous
   (3) Channel select (E) as directed by base station
   (4) Mode switch (A) EKG and voice

G. Conduct electrode operations check
   (1) Press electrode check button (O)
   (2) Verify no lights (P) (RA, LA, LL)
   (3) Set lead select switch (M) to I, II, or III as directed by base station

Summary of possible causes of poor EKG's
- Improper application of electrodes (R) due to:
  - Excessive hair
  - Oily, dirty, scaly skin
  - Excessive perspiration
- Broken or defective:
  - EKG cable (re)
  - Electrode wire connections (rg)
  - Snap/electrode connections
  - Electrode paste has dried out due to exposure to air prior to use
- Faulty electronics in EKG unit (can be checked by - "electrode check" operating mode
  - Standard
  - Snaps)

- Electrical interference from nearby electrical equipment or magnetic fields
- Communication interferences from nearby high buildings/structures
- Static electricity caused by synthetic clothing
- Patient movements from:
  - Body thrashings
  - Muscle tremors
  - Large respiratory movements
  - Bouncing ambulances
- Large amounts of fatty tissue beneath electrodes
**DEFIBRILLATION**

- **Electric Shock** delivered across the chest can terminate some abnormal heart arrhythmias by simultaneously discharging all the muscle fibers of the heart. This can produce a synchronized ventricular contraction that can result in the heart "converting" to a more normal rhythmic performance.

- The Telecare units in operations by the Houston Fire Department can only deliver unsynchronized countershock which is used to convert:
  - Ventricular fibrillation
  - Ventricular tachycardia
  - Paroxysmal atrial tachycardia
  (If carotid massage is unsuccessful)

**Cautions**

1. Electric shock is administered only upon specific directions that are given by the base station duty physician.

2. Chest burns to the victim can result from multiple high-energy discharges if poor contact between paddles and skin occurs. Poor contact can result from:
   - Chest deformities
   - Inadequate downward pressure during defibrillation
   - Insufficient amounts of conductive solution or jelly placed between paddles and skin

3. Excessive amounts of conductive jelly can result in a short circuit between paddles and a drop in current delivered to patient.

4. Handle paddles carefully and do not touch metal surface of the paddles or the patient during discharge.

5. Paddles should be located over:
   - Base of heart (between patient's right collar bone and sternum)
   - Apex of heart (below left nipple and under breasts)
<table>
<thead>
<tr>
<th>CODE</th>
<th>CONTROL/DISPLAY</th>
<th>CONTROL POS./ INDICATOR</th>
<th>FUNCTION</th>
</tr>
</thead>
</table>
| Q    | DEFIBRILLATOR POWER SWITCH | ON/OFF                   | • Provides power from Defibrillator Battery to defibrillator circuit.  
                                 |                         | • Drains Defibrillator circuit. |
| R    | DEFIBRILLATOR CHARGE/DRAIN | CHARGE/DRAIN             | • Defibrillator circuit is charged when switch is held in this position. Monitor charging on defibrillator display (S).  
                                 |                         | • Defibrillator circuit is drained when held in this position until defibrillator display (S) reads zero. |
| S    | DEFIBRILLATOR ENERGY DELIVERABLE DISPLAY | ENERGY DELIVERABLE DISPLAY | • Displays energy available in defibrillator circuit for delivery to victim. |

NOTE: Also see R0 for Defibrillator Paddle usage discussion
<table>
<thead>
<tr>
<th>CODE</th>
<th>CONTROL/DISPLAY</th>
<th>CONTROL POS./INDICATOR</th>
<th>FUNCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>BLOOD PRESSURE POWER SWITCH</td>
<td>ON/Off</td>
<td>• Turns on power to blood pressure circuitry. (This activates steady tone in speaker/headset.)&lt;br&gt;• Turns off power to blood pressure circuitry. (This deactivates tone in speaker/headset.)</td>
</tr>
<tr>
<td>U</td>
<td>START BUTTON</td>
<td>DEPRESSED/RELEASED</td>
<td>• Initiates display of cuff pressure in the systolic (W) and diastolic (X) displays. (Zero if no cuff pressure)&lt;br&gt;• No function.</td>
</tr>
<tr>
<td>V</td>
<td>SOUNDS BUTTON</td>
<td>DEPRESSED/RELEASED</td>
<td>• Freezes systolic B/P display (W).&lt;br&gt;• After start button (U) depressed and sounds button pushed, freezes diastolic B/P display (X). (This is cuff pressure at time of release)</td>
</tr>
<tr>
<td>W</td>
<td>SYSTOLIC BLOOD PRESSURE DISPLAY</td>
<td>SYSTOLIC</td>
<td>• Digital display of cuff blood pressure.&lt;br&gt;  - Initiated by depressing start button (U).&lt;br&gt;  - Frozen by depressing sounds button (V) when operator hears 1st heart beat sounds.</td>
</tr>
<tr>
<td>X</td>
<td>DIASTOLIC BLOOD PRESSURE DISPLAY</td>
<td>DIASTOLIC</td>
<td>• Digital display of cuff pressure.&lt;br&gt;  - Started by depressing start button (U).&lt;br&gt;  - Displays cuff pressure when sounds button (V) depressed.&lt;br&gt;  - Frozen by release of sounds button (V).&lt;br&gt;  - Releasing sounds button freezes diastolic pressure display (X). (This is cuff pressure at time of release)</td>
</tr>
</tbody>
</table>

**NOTE:** When sounds button (V) released at time last heart beat sound is heard, diastolic pressure is displayed.
# Telecare Resuscitation Equipment

<table>
<thead>
<tr>
<th>Location Reference</th>
<th>Equipment</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>BB</td>
<td>Emergency Oxygen</td>
<td>Provide oxygen for respiration assistance</td>
</tr>
<tr>
<td>LA</td>
<td>Right Angle Adapter</td>
<td>Optional connector between resusci bag and mask to change angle between them and permit easier use of bag in certain positions.</td>
</tr>
<tr>
<td>LB</td>
<td>Airways</td>
<td>Maintain open airway in unconscious victim.</td>
</tr>
<tr>
<td>LC</td>
<td>Resusci Bag</td>
<td>To pump air into lungs and allow exhaled air to be expelled, when spontaneous respiration is absent.</td>
</tr>
<tr>
<td>LD</td>
<td>Mask</td>
<td>To seal mouth/nose when using resusci bag.</td>
</tr>
<tr>
<td>LG</td>
<td>Aspirator</td>
<td>Remove fluids and small particles from throat.</td>
</tr>
</tbody>
</table>

Prededing Page Blank Not Filmed
EMERGENCY OXYGEN CHECKLIST

- Obtain: OXYGEN DISPENSER and CANISTER.
- Unlatch and remove CONTAINER BOTTOM.
- Insert CANISTER into CONTAINER.
- Replace and latch CONTAINER BOTTOM.
- Place MASK over victim's mouth.
- Degress PLUNGER.
- Verify oxygen flow.
EMERGENCY OXYGEN (BB) PROCEDURES

1. Remove OXYGEN DISPENSER (BB) from Telecare unit.

2. Obtain CANISTER.
   \textbf{NOTE:} Keep the CANISTER and TUBING dry, as dampness tends to reduce the oxygen flow rate.

3. Squeeze container bottom LATCH and remove CONTAINER BOTTOM.

4. Slip CANISTER into CANISTER GUIDES, IGNITER toward PLUNGER.

5. Replace CONTAINER BOTTOM.
   - Squeeze container bottom LATCH.
   - Push CONTAINER BOTTOM against bottom of CANISTER until it is in lock ring.
   - Release LATCH and verify CANISTER BOTTOM locked.

6. Unfold preconnected MASK with TUBING and place over victim's mouth.

7. Depress PLUNGER to activate oxygen flow.

8. Confirm oxygen flow.
   - Check IN-LINE FLOW INDICATOR (it should move in direction of flow).

\textbf{NOTE:} Oxygen flow will continue for approximately 15 minutes. It cannot be stopped.

\textbf{CAUTION}

The canister generates much heat and is very hot when activated. Never handle the canister with bare hands after use. The container will also get hot, and therefore should be handled carefully.

\textbf{WARNING}

Pure oxygen is always a hazard. Avoid smoking and any other sources of fire or sparks when the emergency oxygen is activated.
1. UNSTOW RESUSCI BAG AND MASK.
2. UNFOLD RESUSCI BAG.
3. CONNECT RESUSCI BAG TO MASK.
4. HYPEREXTEND VICTIM'S NECK AS SHOWN.

CAUTION

WHEN NECK OR HEAD INJURY SUSPECTED, STABILIZE NECK, AND USE AIRWAY IF UNCONSCIOUS

5. MAINTAIN HEAD EXTENSION, PICK UP BAG/MASK AND CLAMP SNUGLY TO VICTIM'S FACE.

6. MAINTAIN UPWARD LIFT ON JAW AND FULL HEAD EXTENSION.

7. SQUEEZE BAG UNTIL VICTIM'S CHEST RISES. (IF CHEST DOES NOT RISE, CHECK FOR BLOCKED AIRWAY.)

8. RELEASE BAG AND LET VICTIM EXHALE PASSIVELY. (EACH EXHALATION SHOULD CLOUD MASK MOMENTARILY.)

9. REPEAT STEPS 7 AND 8 15 TIMES PER MINUTE UNTIL SPONTANEOUS RESPIRATION RETURNS.
ASPIRATOR PROCEDURES

1. Pull out CARTRIDGE HOLDER.

2. Turn CARTRIDGE HOLDER upside down. (Knurled knob will be on top.)

3. Push CARTRIDGE HOLDER firmly down into VACUUM BOTTLE.

4. Hang assembly around neck with STRAP, or keep unit upright while in use.

5. Turn knurled knob clockwise. (This controls amount of vacuum)

   **CAUTION**
   
   If not in upright position, liquid freon may escape and cause blisters if allowed to drip on skin.

6. Insert SUCTION TIP into area to be aspirated.

7. When through, turn knurled knob counterclockwise until it is tight.

8. Pull out CARTRIDGE HOLDER.

9. Dump contents into sample container.

10. Return contents with victim to hospital.

11. Temporarily stow CARTRIDGE HOLDER and VACUUM BOTTLE separately prior to next use.

12. Flush with saline.

13. Clean and sterilize VACUUM BOTTLE, TIP and SUCTION TUBE.

14. Turn CARTRIDGE HOLDER up.

15. Push CARTRIDGE HOLDER into VACUUM BOTTLE.

16. Replace cartridge, if necessary.

17. Stow ASPIRATOR in Telecare unit.
LIFE IS SUSTAINED BY A CLOSE RELATIONSHIP BETWEEN THE HEART, LUNGS AND BRAIN. THE HEART PUMPS OXYGEN DEFICIENT BLOOD TO THE LUNGS WHERE IT PICKS-UP OXYGEN FROM THE FRESH INSPIRED AIR AND DUMPS WASTE CARBON DIOXIDE INTO EXPIRED AIR. THE OXYGEN-ENRICHED BLOOD IS THEN RETURNED TO THE HEART WHERE IT IS PUMPED TO THE BRAIN AND OTHER PARTS OF THE BODY. AS LONG AS THE BRAIN CELLS RECEIVE PROPER NOURISHMENT, THE BRAIN AND NERVOUS SYSTEM SEND SIGNALS TO THE HEART AND LUNGS THAT REGULATE THEIR ACTIVITY.

INTERRUPTION OF AIR OR OXYGEN SUPPLY TO THE LUNGS, REDUCING SUPPLY OF OXYGEN TO THE BRAIN, RESULTS IN A SLOWING DOWN AND STOPPING OF SIGNALS THAT REGULATE THE LUNGS AND HEART. COMPLETE BLOCKAGE OR DEPRIVATION OF AIR WILL CAUSE BRAIN CELLS TO DIE IN 4-6 MINUTES. PARTIAL OBSTRUCTION WILL TAKE LONGER.

AS A RESULT OF THIS VERY SHORT RESPONSE TIME, THE NUMBER ONE PRIORITY IN VICTIM CARE IS TO ESTABLISH AND MAINTAIN AN OPEN AIRWAY AND SPONTANEOUS RESPIRATION FOR THE TRANSPORT OF OXYGEN.

RESPIRATION (EXCHANGE OF O₂ AND CO₂) OCCURS IN THE LUNGS AS NOTED BELOW. THE THROAT DIVIDES INTO TWO TUBES, ONE TO THE STOMACH (ESOPHAGUS OR GULLET) AND ONE TO THE LUNGS (TRACHEA OR WINDPIPE). THE "VOICE BOX" OR LARYNX IS LOCATED AT THE ENTRANCE TO THE TRACHEA WHICH IS COVERED AND PROTECTED BY THE EPIGLOTTIS DURING SWALLOWING SO THAT FOOD IS DIRECTED TO THE ESOPHAGUS. IT IS THIS AREA OF THE THROAT WHERE AIRWAY OBSTRUCTION USUALLY OCCURS FROM FOREIGN MATERIAL.
INSPIRATION:

- Expanded right lung
- Expanded rib cage
- Contracted diaphragm

① Rib muscles contract to raise and expand rib cage.
② Diaphragm muscles contract and pull diaphragm down.
③ This enlarges cavity and sucks in air.

EXPIRATION:

- Right, left lung
- Relaxed diaphragm
- Rib muscles and diaphragm relax.

- Abdominal muscles pull ribs and sternum down.
- Elastic tissue in lungs then force air out of lungs.

**RESPIRATION**

- Controlled automatically by nervous system in response to sensed blood chemistry and other body needs.
- Normal respiration rate (14-20 breaths/min.) approximately 500 cc of air per breath.

<table>
<thead>
<tr>
<th></th>
<th>Inspired Air</th>
<th>Expired Air</th>
<th>Resusci-Bag</th>
<th>Oxygen Mask</th>
<th>Air Bag with 100% Oxygen and Reservoir</th>
</tr>
</thead>
<tbody>
<tr>
<td>OXYGEN (O2)</td>
<td>21%</td>
<td>16%</td>
<td>21%</td>
<td>~ 95%***</td>
<td>~ 47%</td>
</tr>
<tr>
<td>CO2</td>
<td>.04%</td>
<td>4.4%</td>
<td>.04%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N2</td>
<td>74%</td>
<td>79%</td>
<td>74%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Mouth-to-mouth resuscitation and Resusci-Bag will force oxygen into lungs even if the breathing process, described above, is not spontaneous—provided no airway obstruction exists.

**Oxygen masks are of two basic types:**

- Continuous flow (low pressure) with exhalation valves
- Demand/forced flow (relatively high pressure) with exhalation valves. Oxygen is provided upon demand by victim's respirations. Forced flow must be manually activated by EMT.

***% of oxygen inspired is a function of the seal of the mask over victim's face. This seal is maintained by the EMT or the mask securing strap.
• RESPIRATORY ARREST CAN RESULT FROM:
  - BLOCKAGE OF AIRWAY
  - LOSS OF REGULATORY SIGNALS FROM BRAIN AND NERVOUS SYSTEM
  - FAILURE OF HEART TO PUMP AND DISTRIBUTE OXYGENATED BLOOD THROUGHOUT THE BODY

• CAUSES OF AIRWAY BLOCKAGE
  - ACCUMULATION OF FOREIGN MATTER (VOMIT, PHLEGM, FOOD, BROKEN TEETH OR DENTURES, SAND, DIRT OR FOREIGN OBJECT) THAT CANNOT BE ELIMINATED BY COUGHING OR SWALLOWING CAN CREATE AN OBSTRUCTION.
  - WHEN UNCONSCIOUS, VICTIM’S LOWER JAW AND TONGUE RELAX, THIS USUALLY LEADS TO BLOCKAGE OF THE THROAT WHEN VICTIM’S NECK IS BENT FORWARD.
  - SPASMS OF THE VOCAL CHORDS

• RECOGNITION OF AIRWAY OBSTRUCTION/RESPIRATORY ARREST
  - LOOK FOR CHEST BREATHING MOVEMENTS
  - LISTEN AND FEEL AIRFLOW THRU MOUTH AND NOSE
  - NO MOVEMENT OF AIR - COMPLETE OBSTRUCTION
  - NOISY BREATHING - PARTIAL OBSTRUCTION
  - "SNIORING" - USUALLY INDICATES TONGUE BLOCKING AIR PASSAGE
  - "CROWING" - USUALLY INDICATES SPASMS AND CONstrictIONS OF LARYNX
  - GURGLING - FOREIGN MATTER IN WINDPIPE
  - "CYANOSIS" - BLUE-GREY COLOR OF SKIN, TONGUE, LIPS AND NAIL BEDS (IN BLACKS OR OTHER DARK COMPLEXIONED VICTIMS)

BASIC LIFE SUPPORT
UNTIL PROVEN OTHERWISE, AN UNCONSCIOUS VICTIM (WHO DOES NOT RESPOND TO STIMULI) SHOULD BE CONSIDERED TO HAVE RESPIRATORY AND/OR CARDIAC ARREST (IF NOT BREATHING AND NO PULSE)

MOUTH-TO-MOUTH CARDIOPULMONARY RESUSCITATION (CPR), AS DESCRIBED ON THE FOLLOWING PAGES, SHOULD BE INSTITUTED IMMEDIATELY.

AIRWAYS INSTALLATION

IF VICTIM IS:
• CONSCIOUS AND BREATHING NORMALLY - DO NOT INSERT AIRWAY (WILL CAUSE VOMITING)
• UNCONSCIOUS WITH BREATHING OBSTRUCTED:
  - CLEAR AIRWAY OF DEBRIS (WITH FINGERS AND/OR ASPIRATOR).
  - IF DENTURES ARE LOOSE, REMOVE THEM.
  - SELECT CORRECT SIZE AIRWAY FOR VICTIM
  - USING ONE HAND WITH THUMB AND INDEX FINGER CROSSED, PRY PATIENTS TEETH APART AND HOLD MOUTH OPEN
  - INSERT AIRWAY (CURVE BACKWARD AT FIRST ①) THEN TURN TO PROPER POSITION ② OVER TONGUE AS AIRWAY IS PUSHED FURTHER BACK IN THROAT
• AFTER INSTALLATION PREVENT AIR LEAKAGE BY
  - PRESS FLANGE FIRMLY OVER MOUTH
  - PINCH NOSTRIL PRIOR TO MOUTH-TO-MOUTH AS INDICATED IN FOLLOWING PROCEDURES
**BASIC CARDIOPULMONARY RESUSCITATION (CPR)**

**1. AIRWAY CLEARANCE**
- Place victim on flat/hard surface.
- Position victim's head to pull tongue upward away from back of throat and clear airway. Use:
  - Head-tilt
  - Jaw thrust (used if suspected neck injury)
- Clear mouth/airway of debris/foreign objects:
  - Vomitus
  - False teeth
- Force mouth open:
  - Clear debris out with fingers
  - Use aspirator if necessary
  - Roll victim on side, deliver blow with fist in middle of back to dislodge debris blocking airway

**2. BREATHING**
- Maintain head tilt.
- Take deep breath.
- Pinch nostrils closed.
- Seal mouth over victim's mouth (for infant maybe mouth and nose).
- Blow into victim's mouth.
- Watch for victim's chest to rise. If it doesn't, airway is blocked, must be cleared.
- Quickly give 4 ventilations.
- Pinch nostrils between thumb and forefinger before breathing into victim.
- Blow in and watch for chest to rise.
- Lifts to maintain head tilt.

**3. CIRCULATION**
- Check pulse over carotid artery (if no pulse, then:
  - Place heel of hand in position (3-fingers above xiphoid process).
- Place other hand on top of first (may interlock fingers but do not allow fingers to touch chest wall).
- Position shoulders directly over victim's sternum.
- Keep arm stiff.
- Compress chest with regular pushes without bounding or snapping.
- Count and circulate as per 1-min. 2-man procedures on next pages.
- Compress:
  - 1.5-2" (adults)
  - 1.5-1.5" (children)
  - .75-1" (infant)
## 1-MAN CPR

- **MUST AVERAGE 60 COMPRESSIONS PER MINUTE, THEREFORE MUST COMPRESS AT A HIGHER RATE (APPROXIMATELY 80/MIN.) TO ALLOW FOR TIME LOST DURING VENTILATION.**

### Compression Counts

<table>
<thead>
<tr>
<th>Compresses</th>
<th>Lifts</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1ST CYCLE</strong></td>
<td></td>
</tr>
<tr>
<td>&quot;ONE&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;TWO&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;THREE&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;FOUR&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;FIVE&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td><strong>2ND CYCLE</strong></td>
<td></td>
</tr>
<tr>
<td>&quot;ONE&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;TWO&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;THREE&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;FOUR&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;FIVE&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td><strong>3RD CYCLE</strong></td>
<td></td>
</tr>
<tr>
<td>&quot;ONE&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;TWO&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;THREE&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;FOUR&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;FIFTEEN&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td><strong>NEXT CYCLE</strong></td>
<td></td>
</tr>
<tr>
<td>&quot;ONE&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td>&quot;TWO&quot;</td>
<td>AND&quot;</td>
</tr>
<tr>
<td><strong>FIFTEEN</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Ventilation Counts

- MOVE QUICKLY AND SEAL MOUTH OVER VICTIM'S MOUTH, PINCH NOSE.
- VENTILATE ONCE FULLY
- VENTILATE TWICE FULLY

FiveSeconds

---

2-5
TWO-MAN CPR

- MUST AVERAGE 60 COMPRESSIONS/MIN. OR 1/SECOND
- COMPRESSOR AND VENTILATOR ON OPPOSITE SIDES OF VICTIM

<table>
<thead>
<tr>
<th>COMRESSOR</th>
<th>VENTILATOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIFTS</td>
<td>TAKES DEEP BREATH</td>
</tr>
<tr>
<td>COMPRESSES</td>
<td>MOUTH OVER VICTIM'S</td>
</tr>
<tr>
<td>ONE THOUSAND AND ONE,</td>
<td>VENTILATE ON &quot;FIVE&quot; THRU &quot;ONE THOUSAND&quot;</td>
</tr>
<tr>
<td>ONE THOUSAND AND TWO</td>
<td>OF NEXT CYCLE</td>
</tr>
<tr>
<td>ONE THOUSAND AND THREE</td>
<td>(LIKE BLOWING HANDS OF COMPRESSOR</td>
</tr>
<tr>
<td>ONE THOUSAND AND FOUR</td>
<td>OFF VICTIM)</td>
</tr>
<tr>
<td>ONE THOUSAND AND FIVE</td>
<td></td>
</tr>
</tbody>
</table>

(NO TIME DELAY BETWEEN CYCLES)

- SEAL MASK OVER VICTIM'S FACE
- SQUEEZE BAG ON "FIVE" THRU "ONE THOUSAND AND" OF NEXT CYCLE
- RELEASE BAG AND
- ALLOW TO FILL
- SQUEEZE ON "FIVE" . . .

VENTILATOR ← CHANGE OVER → COMPRESSOR

- (VENTILATING)
- SAY "CHANGE ON THREE AFTER BREATH"
- TAKES DEEP BREATH
- MOUTH OVER VICTIM'S
- VENTILATE ON FIVE-ONE-THOUSAND AND

- MOVES AND POSITIONS HANDS FOR . . .
- COMPRESSION

- ONE THOUSAND AND FOUR (PUSHES HANDS OFF)
- ONE THOUSAND AND FIVE

VENTILATOR

COMPRESSOR
CARDIOVASCULAR SYSTEM (CIRCULATORY SYSTEM)

THIS BLOOD DISTRIBUTION SYSTEM OF THE BODY CONSISTS OF:

- A FOUR-CHAMBERED HEART PUMP THAT MOVES ...
- BLOOD THRU ...
- THE BLOOD VESSEL NETWORK OF BODY THAT INCLUDES:
  - SUPPLY ARTERIES, CARRYING O₂ RICH BLOOD FROM THE LEFT HEART TO ...
  - CAPILLARY BEDS, WHERE CELLS PICK UP O₂ AND DUMP CO₂ INTO THE ...
  - RETURN VEINS, THAT CARRY CO₂ BACK TO THE RIGHT HEART FOR PUMPING TO THE LUNGS WHERE CO₂ IS EXHALED AND NEW O₂ IS PICKED UP BY THE BLOOD. THE NETWORK ALSO INCLUDES ...
  - RETURN LYMPHATICS, DRAIN TISSUES OF FLUIDS AND WASTES, FILTER THESE WASTES, ADD ANTIBODIES TO FIGHT INFECTION AND DUMPS BACK INTO THE VENOUS RETURN FLOW.

ROUND TRIP BLOOD FLOW THRU AVERAGE LENGTH NETWORK CIRCUIT IS APPROXIMATELY 30 SECONDS.

BLOOD

- BLOOD IS THE FLUID TRANSPORTER OF
  - O₂ AND NUTRITION TO AND
  - CO₂ AND WASTES FROM BODY CELLS
  - THEREFORE, IT IS ESSENTIAL TO LIFE.

- THE AVERAGE ADULT HAS ABOUT SIX QUARTS OF BLOOD. LOSS OF ONE QUART IS VERY SERIOUS.

- BLOOD CONTAINS:
  - LIQUID PLASMA - FLUID TRANSPORTER
  - SOLIDS:
    - RED CORPUSCLES - CARRY O₂ TO AND CO₂ FROM CELLS
    - WHITE CORPUSCLES - HELP FIGHT INFECTION
    - PLATELETS - CAUSE BLOOD TO CLOT

- BLOOD FUNCTIONS:
  - RESPIRATION - O₂ TO Cells; CO₂ TO LUNGS
  - NUTRITION - FOOD SUBSTANCES FROM INTESTINES TO TISSUES
  - EXCRETION - WASTES FROM CELLS TO EXCRETORY ORGANS
  - PROTECTION - WHITE CELLS AND ANTIBODIES FIGHT INFECTION
  - REGULATION - DISTRIBUTE HORMONES AND CHEMICAL SUBSTANCES
    - HELPS CONTROL:
      - BODY TEMPERATURE
      - BLOOD ACID-BASE BALANCE
      - FLUID BALANCE

BLOOD WILL:

- SPURT FROM OPENED ARTERY AS BRIGHT RED FLUID.
- FLOW STEADY FROM OPENED VEIN AS DARK BLUISH RED FLUID.
- CLOT USUALLY WITHIN 6-7 MINUTES.
BASIC STRUCTURE OF THE BLOOD VESSEL NETWORK

CIRCULATION TO A PARTICULAR BODY TISSUE AREA USUALLY WILL HAVE:
- ARTERIES, VEINS, AND NERVE FIBERS CONFIGURED IN "CABLE-BUNDLE FASHION" WITH THE ARTERIES LOCATED IN A DEEPER MORE PROTECTED LOCATION.
- THE LYMPHATICS ARE ALSO INCLUDED IN THESE VASCULAR BUNDLES AND FOLLOW CLOSELY THE CONFIGURATION OF THE VEINS.

CELLS OF THE BODY ARE MAINLY WITHIN TISSUE/CAPILLARY BEDS WHERE RESPIRATION (O2 ABSORBED/CO2 SECRETED) ON CELLULAR LEVEL OCCURS.

SIZE OF ARTERIES IS CONTROLLED AUTOMATICALLY BY THE NERVOUS SYSTEM THAT SENDS SIGNALS TO "CONSTRICT" OR "RELAX" VESSELS TO CONTROL BLOOD PRESSURE AND FLOW.

BLOOD VESSEL NETWORK OF CIRCULATORY SYSTEM

LOCATION OF MAJOR SITES FOR TAKING PULSE
**HEART ANATOMY AND PHYSIOLOGY**

The heart is the muscular pump that continuously moves blood (the transport fluid for oxygen, nourishment, CO₂ and wastes) throughout the body's vascular tree or network of blood vessels (arteries, capillaries, and veins).

This four-chambered heart pump utilizing its four one-way flow valves moves:

- Venous return blood with CO₂ from body tissues back to the lungs thru the two right chambers of the heart. In the lungs, CO₂ is released and oxygen is picked up by the blood.
- Life giving oxygenated blood from the lungs to the body tissues thru the two left chambers of the heart.

**CHAMBERS OF THE HEART**
- **Atria**
  - Thin walled chambers
- **Ventricles**
  - Thick walled chambers

**VALVES OF HEART**

<table>
<thead>
<tr>
<th>Right Heart</th>
<th>Left Heart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inflow valves</td>
<td>Inflow valves</td>
</tr>
<tr>
<td>• Tricuspid</td>
<td>• Mitral</td>
</tr>
<tr>
<td>• Pulmonary</td>
<td>• Aortic</td>
</tr>
<tr>
<td>Outflow valves</td>
<td>Outflow valves</td>
</tr>
</tbody>
</table>

The valves of the heart prevent backflow and are opened and closed by differences in blood pressures in the heart chambers and blood vessels. These pressure differences are caused by the contractions and relaxations of the chambers of the heart that result from its unique electrical characteristics.

As the heart pumps blood to the body thru the aortic artery it also pumps blood to sustain itself thru the coronary arteries.

- The complex network of these coronary vessels as well as the constant bending and torsion that they encounter make them especially prone to the effects of arteriosclerosis (hardening of the arteries).
- This disease causes a gradual thickening (hardening) and loss of elasticity of the walls of the blood vessels and thus a reduced blood flow.

- Reduced blood flow to an area may be compensated for by interconnecting arteries dilating and providing an alternate or collateral flow of blood to the area. This process is slow and occurs over a period of time.

- In addition blood clots (thrombus) can suddenly block flow in a coronary artery and cause:
  - **Ischemia** - A lack of oxygen in the myocardial tissue. This can be accompanied by pain such as angina pectoris. If obstruction lasts too long, it can lead to a...
  - **Myocardial Infarction** - An injury to the myocardium which can cause:
    - Weakened capability of the heart muscle to contract
    - Abnormal cardiac electrical impulse formation
    - Failure to conduct impulse properly thru the myocardial tissue

3-3
ELECTRICAL ACTIVITY OF THE HEART

THE RHYTHMICAL MECHANICAL CONTRACTIONS AND RELAXATION OF THE HEART MUSCLES (MYOCARDIUM) ARE CAUSED BY ELECTRICAL IMPULSES THAT ARE AUTOMATICALLY GENERATED BY THE HEART AND ARE CONDUCTED BY THE HEART'S ELECTRICAL SYSTEM THROUGHOUT THE MYOCARDIUM.

SA NODE'S AUTOMATIC FIRING WILL PACE THE HEART'S RESPONSE THRU THE NORMAL CONDUCTION PATH AND WILL RESULT IN NORMAL HEART RATES OF 60-100 BEATS/MIN. THESE RATES ARE DETERMINED BY THE ELECTRICAL PROPERTIES OF THE HEART ITSELF BUT THEY CAN BE MODIFIED BY THE NERVIOUS SYSTEM CONTROLS OF THE HEART.

ANY PART OF THIS CONDUCTION PATH CAN ACT AS A "BACK-UP PACEMAKER" WHEN THE SA NODE FIRING FAILS OR A CONDUCTION PROBLEM EXISTS. INHERENT FIRING RATES FOR OTHER HEART AREAS ARE:

- 75/MINUTE (ATRIA)
- 60/MINUTE (AV NODE)
- 30-40/MINUTE (VENTRICLES)

ABNORMAL PATTERNS MAY OCCUR DUE TO HEART IRRITATION AND INJURIES THAT CAN RESULT IN AN "ECTOPIC" (OUT-OF-PLACE) FOCUS OR LOCATION OF THE PACEMAKER OTHER THAN THE SA NODE.

IN EMERGENCY OR PATHOLOGICAL SITUATIONS AN ECTOPIC FOCUS OR FOCI CAN FIRE AT VERY FAST RATES OF 150-250/MIN.

THESE ABNORMAL PATTERNS CAN RESULT IN TOO SLOW (BELOW 40) AND TOO FAST (ABOVE 150) VENTRICULAR BEATS/MIN, WHERE THE HEART CANNOT PUMP THE BLOOD EFFECTIVELY AND CARDIAC OUTPUT IS AFFECTED SUCH THAT TISSUES DO NOT GET ENOUGH OXYGEN.

THE MYOCARDIUM OF THE HEART IS COMPOSED OF A LATTICWORK OF MUSCLE FIBERS (MYOFIBRIL) THAT RESPOND BY DEPOLARIZING, CONTRACTING AND REPOLARIZING IN A MANNER THAT PRODUCES A WAVE LIKE ACTION AS IT PASSES. EACH FIBER REACTS AS FOLLOWS:

RESTING STATE  ELECTRICAL  DIRECTION OF REPOLARIZATION
(SURFACE POSITIVE)  STIMULUS  (DISCHARGING)  WAVE MOVEMENT

REST  WAVE  CONTRACTED

REST  WAVE  REPOLARIZING

EACH MUSCLE IS STIMULATED AND REACTS SEPARATELY BUT NORMALLY IN A SYNCHRONOUS MANNER WITH THE EXCITATION IMPULSE STARTING IN THE SA NODE AND PASSING THRU THE CONDUCTION PATHWAY CAUSING THE DEPOLARIZING OF THE MUSCLES OF THE ATRIA THEN THE VENTRICLES.
NEURAL ACTIVITY OF THE BODY IS UNDER CONTROL OF THE NERVOUS SYSTEMS:

- CENTRAL NERVOUS SYSTEM
  - CONTROLS VOLUNTARY MUSCLE ACTIVITY LIKE WALKING, TALKING, ETC.
  - INCLUDES: BRAIN
  - SPINAL CORD
  - PERIPHERAL NETWORK OF NERVES TO AND FROM MUSCLES AND SENSORS

- AUTONOMIC NERVOUS SYSTEM
  - CONTROLS AUTOMATICALLY WITHOUT "CONSCIOUS" EFFORT THE INVOLUNTARY BODY ACTIVITIES SUCH AS DIGESTION, RESPIRATION, AND CARDIAC FUNCTIONS.

ALTHOUGH THE HEART AUTOMATICALLY GENERATES ELECTRICAL IMPULSES THAT CAUSE THE MYOCARDIUM TO CONTRACT, THE HEART RATES AND STRENGTH OF HEART RESPONSES ARE REGULATED BY THE AUTONOMIC NERVOUS SYSTEM. THE FOLLOWING IS A SUMMARY OF THIS REGULATION PROCESS.
EKG OR ECG (ELECTROCARDIOTRICK)

THE TOTAL COLLECTIVE ELECTRICAL ACTIVITY ASSOCIATED WITH THE WAVES OF EXCITATION OF THE HEART'S NERVES AND MUSCLES CAN BE RECORDED BY ELECTRODES PLACED ON THE SKIN AND CONNECTED TO AN EKG MACHINE. THIS EQUIPMENT MEASURES, RECORDS AND DISPLAYS THIS ELECTRICAL ACTIVITY OF THE HEART ON STANDARD EKG GRAPH PAPER (SEE PAGE 3-9) THAT MOVES THRU THE EKG RECORDER AT A STANDARD RATE. THE RESULTANT RECORD IS REFERRED TO AS THE "PATIENT'S EKG." THE RECORD CAN BE SIMULTANEOUSLY DISPLAYED ON A CARDIOSCOPE (CATHODE RAY OR TV TYPE TUBE) AS A MOVING DISPLAY, THE EKG PATTERN IS WRITTEN ON THE LEFT OF THE DISPLAY AND IT THEN MOVES TO THE RIGHT AT THE SAME RATE AS A WRITTEN RECORD.

DIFFERENT TYPES OF EKG MEASUREMENTS CAN BE MADE WHICH ARE IN ESSENCE DIFFERENT "VIEWS" OF THE HEART'S ELECTRICAL ACTIVITY FROM DIFFERENT ANGLES AROUND THE BODY DEPENDENT UPON THE INSTALLATION AND CONNECTION OF ELECTRODES. THE TWO MAJOR TYPES OF EKG'S ARE:

- THREE-LEAD EKG
  - USED IN PRE-HOSPITAL EMERGENCY CARE.
  - INCLUDES:
    - 3 STANDARD BIPOLAR (BETWEEN TWO ELECTRODES) MEASURES:
      - LEAD I (RIGHT ARM-LEFT ARM) (RA-LA)
      - LEAD II (RIGHT ARM-LEFT LEG) (RA-LL)
      - LEAD III (LEFT ARM-LEFT LEG) (LA-LL)
  - MEASURES HEART ACTIVITY FROM FRONT OF BODY (FRONTAL PLANE)

TRANSMISSION OF GOOD QUALITY EKG'S IS ESSENTIAL FOR RAPID VICTIM ASSESSMENT AND RAPID DETERMINATION OF THE PROPER PRE-HOSPITAL TREATMENT REQUIRED. FACTORS IMPORTANT IN THIS PROCESS ARE:

A. GOOD MAINTENANCE AND OPERATION OF THE EKG EQUIPMENT
   - PROPER HANDLING AND STOWAGE OF EKG EQUIPMENT
   - PROPER CLEANING
   - PROPER PRE-CALL
     - EKG EQUIPMENT CHECKS (SEE PAGE 1-11)
     - EKG BATTERY CHARGING OPERATIONS (SEE PAGE 1-10)
   - PROPER CONTROL OPERATIONS (SEE PAGES 1-11 AND 1-12)

B. PROPER BODY SITE SELECTION FOR ELECTRODE INSTALLATION
   - SELECT SITES FOR ELECTRODE INSTALLATION AS ILLUSTRATED.
   - NOTE: WOMEN WITH PENDULOUS BREASTS MAY REQUIRE INSTALLATION OF "LL" ELECTRODE MORE TO THE SIDE AND BACK OF THE BODY OR UNDERNEATH THE BREAST. IF UNDERNEATH SITE IS SELECTED THEN ADDITIONAL CLEANING OF SITE MAY BE REQUIRED DUE TO EXCESSIVE OIL, POWDER AND MOISTURE THAT MAY BE IN THAT AREA.

C. SITE PREPARATION
   - (1) CLEANSE ALL THREE SITES THOROUGHLY WITH ALCOHOL OR STERILE WIPES.
   - (2) RUB SITES WITH GAUZE PAD OR PAPER TOWEL - ABOUT 5 SECONDS EACH. (THIS ABRADING INCREASES ELECTRICAL CONDUCTIVITY OF SKIN.)

D. ELECTRODE APPLICATION (ELECTRODE TYPE - PREGELLED)
   - (1) REMOVE ELECTRODES FROM PACKAGE (OPEN JUST PRIOR TO USE)
   - (2) APPLY TO SITE (START AT TOP EDGE AND ROLL DOWNWARD)
   - (3) THEN PAT ENTIRE SURFACE OF ELECTRODE

E. CONNECTION OF ELECTRODE WIRES TO ELECTRODES AND EKG CABLE (THESE CONNECTIONS MAY HAVE BEEN ACCOMPLISHED PREVIOUSLY BUT CHECKS SHOULD BE MADE FOR ACCURACY AND INTEGRITY.)
   - (1) CONNECT (OR VERIFY) WIRE SNAPS (RH) TO ELECTRODES
   - (2) CONNECT OR VERIFY EKG WIRES (RG) TO EKG CABLE
   - (3) MAKE SURE EKG CABLE (RE) IS CONNECTED TO UNIT
CAUTIONS

- Do not allow tension to be placed on any of wiring connections between patient and EKG unit
  - Cable at unit
  - Cable to electrode wires
  - EKG snaps or electrodes
- String wires from patient electrodes to unit in a manner that minimizes the "over the body" stringing of the lines.

EKG unit note: Attach clip to patient's clothing or stretcher to prevent electrode detachment.

- Keep lines from patient to EKG unit as free as possible from such things as feet, and other equipment (particularly metal type)

F. Verify EKG unit power and communications switch settings
(1) Main power (H) on
(2) Transmitter (D) continuous
(3) Channel select (E) as directed by base station
(4) Mode switch (A) EKG and voice

G. Conduct electrode operations check
(1) Press electrode check button (O)
(2) Verify no lights (P) (RA, LA, LL)
(3) Set lead select switch (M) to I, II, or III as directed by base station

Summary of possible causes of poor EKG's
- Improper application of electrodes (R) due to:
  - Excessive hair
  - Oily, dirty, scaly skin
  - Excessive perspiration
- Broken or defective:
  - EKG cable (R)
  - Electrode wire connections (R)
  - Snap/electrode connections
  - Electrode paste has dried out due to exposure to air prior to use
- Faulty electronics in EKG unit (can be checked by "electrode check" operating mode
  - Standard
  - Snaps)
- Electrical interference from nearby electrical equipment or magnetic fields
- Communication interferences from nearby high buildings/structures.
- Static electricity caused by synthetic clothing
- Patient movements from:
  - Body thrashings
  - Muscle tremors
  - Large respiratory movements
  - Bouncing ambulances
- Large amounts of fatty tissue beneath electrodes

3-8
The heart is a synchronous electro-chemical-mechanical pump.

Cardiac chemical events result in electrical activity of the heart which in turn results in mechanical contractions and valve movements that force the blood throughout the lungs and body. All of these events must occur in a synchronized, integrated manner to be efficient.

Due to the correlation of cardiac events, much can be inferred by analyzing EKG wave forms and intervals.

Electrocardiographic Grid

- Normal EKG characteristics:
  - P, R, T waves are upright (positive)
  - Q wave usually inverted (negative) but may be absent
  - S wave is inverted (negative)
  - All P waves trigger QRS complexes
  - T waves follow QRS complexes
  - ST and TP segments are flat on baseline showing zero electrical activity
  - Number of P waves/minute = atrial rate
  - Number of R waves/minute = ventricular rate

- Adult normal range (seconds):
  - P-R interval: .12 - .20 (atrioventricular conduction time)
  - QRS interval: .07 - .10 (ventricular discharge time)
  - S-T segment: .11 - .16 (rest prior to ventricular rechage time)
  - QT interval: .27 - .43 (ventricular discharge and recharge time)

Electrical components of normal EKG (Lead II)

- Atrial events:
  - Buried in QRS

- Ventricular events:
  - Rest

- Physical components of EKG:
  - SA node
  - AV node
  - B. branches
  - Bundle of His
  - Atrial muscles
  - Ventricular muscles

- QRS:
  - Discharge

- T:
  - Rest
  - Recharge

Cardiac Events

- Blood pressure:
  - Systolic (average peak pressure)
  - Diastolic (average base pressure)

- Heart functions:
  - Filling
  - Ejecting
  - Filling
  - Ejecting

- Heart valve actions:
  - Outflow valves: closed → open → closed → open
  - Inflow valves: open → closed → open → closed
### Normal EKG Segment Characteristics (Lead II)

<table>
<thead>
<tr>
<th>P-Wave</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Upward (+) smooth symmetrical deflection</td>
</tr>
<tr>
<td>• One P wave precedes each QRS complex</td>
</tr>
<tr>
<td>• Each P wave follows T wave or last cycle</td>
</tr>
<tr>
<td>• Represents atrial depolarization</td>
</tr>
</tbody>
</table>

### PR Interval

<table>
<thead>
<tr>
<th>PR Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>• 0.12-0.2 second</td>
</tr>
<tr>
<td>• 3-5 EKG blocks</td>
</tr>
<tr>
<td>• Represents electrical passage thru conduction path</td>
</tr>
</tbody>
</table>

### Unrecognizable "P" Waves

<table>
<thead>
<tr>
<th>Unrecognizable &quot;P&quot; Waves</th>
</tr>
</thead>
<tbody>
<tr>
<td>• P wave buried in T wave</td>
</tr>
<tr>
<td>• Too fast ventricular rates cause mixing of T and P waves</td>
</tr>
</tbody>
</table>

### Prolonged PR Interval

<table>
<thead>
<tr>
<th>Prolonged PR Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PR interval greater than 0.2 sec.</td>
</tr>
<tr>
<td>• Indicates delay in conduction thru the AV node</td>
</tr>
</tbody>
</table>

### Short PR Interval

<table>
<thead>
<tr>
<th>Short PR Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PR interval is shortened</td>
</tr>
<tr>
<td>• P's precede QRS's</td>
</tr>
</tbody>
</table>

### Multiple "P" Waves for Each QRS

<table>
<thead>
<tr>
<th>Multiple &quot;P&quot; Waves for Each QRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Atrial flutter (F) waves are sawtoothed</td>
</tr>
<tr>
<td>• Fast firing atrial ectopic focus</td>
</tr>
</tbody>
</table>

### Missing "P" Waves

<table>
<thead>
<tr>
<th>Missing &quot;P&quot; Waves</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Occasional large bizarre QRS without P wave</td>
</tr>
<tr>
<td>• Indicates ectopic focus in ventricles</td>
</tr>
</tbody>
</table>

### Other Odd-Shaped "P" Waves

<table>
<thead>
<tr>
<th>Other Odd-Shaped &quot;P&quot; Waves</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Inverted &quot;P&quot; wave</td>
</tr>
<tr>
<td>• Pacing ectopic focus in atria</td>
</tr>
</tbody>
</table>

### Spiked Wave Preceding QRS

<table>
<thead>
<tr>
<th>Spiked Wave Preceding QRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Needle-sharp wave</td>
</tr>
<tr>
<td>• Indicates artificial pacemaker</td>
</tr>
<tr>
<td>EKG SEGMENT DISCUSSION</td>
</tr>
<tr>
<td>-------------------------</td>
</tr>
<tr>
<td><strong>PR INTERVAL</strong></td>
</tr>
<tr>
<td>• 0.12-0.2 second</td>
</tr>
<tr>
<td>• 3-5 EKG blocks</td>
</tr>
<tr>
<td>• Represents electrical passage thru conduction path</td>
</tr>
</tbody>
</table>

| **QRS**                  |
| • CRISP, THIN, SPIKED WAVES |
| • Q WAVE IS NEGATIVE OR MAY BE ABSENT DUE TO HEART PLACEMENT |
| • R WAVE IS TALLEST EKG WAVE |
| • S WAVE IS DOWNWARD WAVE FOLLOWING R WAVE |
| • Represents Ventricular Depolarization |

| **ST SEGMENT**           |
| • Zero electric period between the S and T waves |
| • FLAT AND ON BASELINE |
| • Represents initial slow phase of Ventricular repolarization |

| **T WAVE**               |
| • Upward (+) smooth symmetrical deflection |
| • One T wave follows each QRS |
| • Represents Ventricular repolarization |

| **Prolonged PR Interval** |
| • Interval greater than .2 sec. |
| • Represents delay in conduction through the AV node |

| **Short PR Interval**     |
| • Interval is shortened |
| • Represents ectopic focus in atria or AV node |

| **Varying PR Intervals**  |
| • Varying lengths of PR intervals |
| • Represents atrial premature activity |

| **Occasional Distorted, Slurred, Bizarre Waves** |
| • Represents large wave occurring occasionally |
| • Ectopic focus in His-Purkinje system |
| • Premature Ventricular contraction (PVC) |

| **Notched or Prolonged QRS** |
| • Represents notched or prolonged R wave |
| • Represents blockage or delay in His-Purkinje system called bundle branch block |

| **Slurred Depressed ST Segment** |
| • ST segment is large and depressed |
| • Suggests Digitalis effects |

| **Enlarged Q Wave** |
| • Q wave is 1/3 or greater size of QRS |
| • Suspect Myocardial Infarction (Heart Injury) |

| **Bizarre and Chaotic** |
| • Disorderly pattern, wandering baseline, different shaped waves |
| • Fibillation of ventricles (rapidly fatal) |

| **Elevated ST Segment** |
| • ST segment elevated above the baseline since S wave does not return to zero |
| • Suspect recent myocardial infarction (cardiac muscle injury) |

| **Horiizontally Depressed ST Segment** |
| • ST segment depressed below baseline |
| • "Digitalis" drug effect |
| • Indicates insufficient blood supply (oxygen) to cardiac muscles (ischemia) |

| **Tall Peaked T-Wave** |
| • Indicates high serum potassium (K⁺) |

| **Miscellaneous**     |
| • Multiple QRS's occur |
| • Ectopic focus in AV node |

| **Foldout Frame**      |
| • Indicates old myocardial infarction (heart muscle "injury") or pulmonary infarction |

3-10
EKG EMT EVALUATION ELEMENTS

I. HEART RATES

- **Heart Rate** = The number of ventricular contractions (pulses) or "R" waves that occur in one minute
- **Adult Heart Rate Classifications**
  - **Normal Rates** = 60-100/minute or (3, 4 or 5 "R" waves on Telecare scope at once)
  - **High Rates (Tachycardias)** = More than 100/minute or (more than 5 "R" waves/scope)
  - **Low Rates (Bradycardias)** = Less than 60/minute or (less than 3 "R" waves/scope)

- **Determining Heart Rates**:
  1) Count number of "R" waves on-scope at the same time,
     multiply X 20 = Gross Estimate of Heart Rate
  2) Count number of "R" waves as they disappear from scope for 6 seconds,
     multiply X 10 = Reasonably Accurate Heart Rate Estimate

From EKG Strip:

1) **Count** number of 5 mm lines (or blocks) between any two "R" waves and divide into 300,
   - 1 block = 300
   - 2 blocks = 150
   - 3 blocks = 100
   - 4 blocks = 75
   - 5 blocks = 60

**Cautions** — Heart rates that are too slow or too fast usually result in decreased cardiac outputs (amount of blood pumped per minute) that cause lowered systolic blood pressures which can lead to circulatory shock and insufficient oxygen supply to body tissues.

II. HEART RHYTHM

The rhythm (or regularity) of the occurrence of ventricular contractions (pulses) or "QRS" complexes determines heart rhythm. It can be determined by comparing the duration of the R-R intervals as they occur. If intervals are:

- **Equal** = Regular rhythm
- **Unequal** = Irregular rhythm

Irregular rhythms may be caused by:

- Variations in pacing impulse formations
- Appearance of premature beats
- Blockage or delays in the conduction pathways of heart

III. ATRIAL-VENTRICULAR RATE RELATIONSHIPS

In analyzing EKG's, it is important to determine if atrial (P waves) trigger or are followed by ventricular (QRS complexes) or if the atrial and ventricular rates are the same.

Variations in these rates can result from:

- Atrial impulse formation problems (rate variations and site locations), and
- Conduction delays or blocks thru the conduction pathways, which in turn will cause wave pattern alterations and misplaced locations within the EKG cycle of P waves and QRS complexes.

IV. P-WAVE EVALUATION (SEE PAGE 3-10, EKG CHARACTERISTIC'S DISCUSSION)

Examine P waves to determine if they are:

- **Normal P waves** = Upright (positive), smoothly rounded, and precede QRS's at a normal P-R interval and all same shape.
- **Abnormal P waves** can be:
  - Deformed
  - Multiple
  - Negative
  - PR interval too long or too short
  - Absent

V. QRS COMPLEX EVALUATION (SEE PAGE 3-10, EKG CHARACTERISTIC'S DISCUSSION)

Examine QRS complex and determine if they are:

- **Normal** = Sharp, crisp, sharp pointed
- **Abnormal** = Bizarre appearances and wide and slurred
CARDIAC VICTIM'S
DIAGNOSTIC SIGNS AND SYMPTOMS

THE EKG IS A VALUABLE DIAGNOSTIC TOOL BUT IT MUST ALWAYS BE CORRELATED WITH THE VICTIM'S DIAGNOSTIC SIGNS AND SYMPTOMS. IT IS IMPORTANT THAT THE EMT MAINTAIN CLOSE SURVEILLANCE OF THE VICTIM'S CONDITION AND REPORT DISTINCTIVE CHANGES TO THE BASE STATION, PARTICULARLY IF THEY HAPPEN AT THE SAME TIME AS NOTICEABLE DIFFERENCES IN THE EKG.

A SUMMARY OF TYPICAL SIGNS AND SYMPTOMS THAT CAN BE ANTICIPATED WITH SOME MAJOR CORONARY PATHOLOGICAL CONDITIONS IS PRESENTED BELOW. IN ADDITION, A SUMMARY OF ABNORMAL EKG EFFECTS ASSOCIATED WITH PATHOLOGICAL CONDITIONS IS PRESENTED ON THE FOLLOWING PAGE.

<table>
<thead>
<tr>
<th>SYMPTOMS AND SIGNS</th>
<th>PATHOLOGICAL CORONARY CONDITION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CARDIAC ARREST</td>
</tr>
<tr>
<td></td>
<td>LEFT</td>
</tr>
<tr>
<td>BLOOD PRESSURE:</td>
<td></td>
</tr>
<tr>
<td>SYSTOLIC</td>
<td>DROPS (LATE-POSSIBLY)</td>
</tr>
<tr>
<td>DIASTOLIC</td>
<td>DROPS (LATE-POSSIBLY)</td>
</tr>
<tr>
<td>PULSE PRESSURE</td>
<td></td>
</tr>
<tr>
<td>RESPIRATION</td>
<td></td>
</tr>
<tr>
<td>ABSENT</td>
<td>LABORED (POSSIBLY)</td>
</tr>
<tr>
<td>LABORED</td>
<td></td>
</tr>
<tr>
<td>PULSE</td>
<td></td>
</tr>
<tr>
<td>UNOBtainABLE</td>
<td>WEAK</td>
</tr>
<tr>
<td>SKIN</td>
<td></td>
</tr>
<tr>
<td>TEMP</td>
<td>COLD</td>
</tr>
<tr>
<td>COLOR</td>
<td>PALE TO BLUE</td>
</tr>
<tr>
<td>BEHAVIOR</td>
<td></td>
</tr>
<tr>
<td>RESTLESS</td>
<td></td>
</tr>
<tr>
<td>ANXIOUS</td>
<td></td>
</tr>
<tr>
<td>FEELS WEAK</td>
<td></td>
</tr>
<tr>
<td>STATE OF-consciousness</td>
<td>UNCONSCIOUS</td>
</tr>
<tr>
<td>EYES</td>
<td>PUPILS</td>
</tr>
<tr>
<td>DILATED</td>
<td></td>
</tr>
<tr>
<td>NAUSEA</td>
<td></td>
</tr>
<tr>
<td>VOMITING</td>
<td></td>
</tr>
<tr>
<td>EDEMA (SWELLING)</td>
<td></td>
</tr>
<tr>
<td>PAIN</td>
<td></td>
</tr>
<tr>
<td></td>
<td>INTENSE SUBSTERNAL, NOT RELATED TO PHYSICAL ACTIVITY OR POSITION, MAY LAST FOR MORE THAN ONE HOUR</td>
</tr>
</tbody>
</table>

GLOSSARY

1. ANGINA PECTORIS - SUDDEN PAIN IN THE SUBSTERNAL AREA RADIATING TO UNDERSIDE OF LEFT ARM FROM MYOCARDIAL ISCHEMIA (INADEQUATE BLOOD SUPPLY) CAUSED BY PHYSICAL EXERTION OR EMOTIONAL STRESS.
2. CARDIAC ARREST - A CONDITION WHERE THE HEART CEASES TO PUMP BLOOD EFFECTIVELY DUE TO IMPROPER ELECTRICAL OR ELECTROMECHANICAL ACTIVITY OF THE HEART. DEATH IS IMMINENT UNLESS IMMEDIATE CPR IS PROVIDED. THIS INCLUDES BOTH VENTRICULAR STANDSTILL AND VENTRICULAR FIBRILLATION.
3. CARDIOGENIC SHOCK - A CONDITION RESULTING FROM INADEQUATE PROPELLENT FL ow OF BLOOD INTO THE AORTA, THUS INADEQUATE FLOW OF BLOOD TO BODY CAPILLARIES OF TISSUES AND ORGANS.
4. CONGESTIVE HEART FAILURE - EXCESSIVE BLOOD OR TISSUE FLUID IN THE LUNGS OR BODY CAUSED BY THE FAILURE OF THE VENTRICLES TO PUMP BLOOD EFFECTIVELY. THIS CAN OCCUR FROM EITHER LEFT AND/OR RIGHT VENTRICULAR INADEQUACIES.
5. MYOCARDIAL INFARCTION (MI) - INJURY OR DEATH OF CARDIAC VENTRICULAR MUSCLES DUE TO OBSTRUCTION OF ONE OR MORE CORONARY ARTERIES RESULTING IN INADEQUATE SUPPLY OF OXYGEN TO THE HEART MUSCLE.
6. PULMONARY EMPHYSEMA - DISEASE OF LUNGS CHARACTERIZED BY ENLARGEMENT AND DESTRUCTIVE CHANGES IN THE ALVEOLAR AIR SPACES WHICH MAKES BREATHING DIFFICULT.
7. PULMONARY INFARCTION - OBSTRUCTION OF THE PULMONARY ARTERY FLOW BY CLots (EMBOLISMS) OR OTHER MATERIAL. THIS IS USUALLY ACCOMPANIED BY CHEST PAINS, SHORTNESS OF BREATH, COUGHING AND BLOODY SPUTUM.
### Abnormal EKG Effects Associated with Pathological Conditions

<table>
<thead>
<tr>
<th>Abnormal EKG Pattern Segments</th>
<th>Abnormal Pathological Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Voltage in All Leads</td>
<td>Myocardial Infarction (MI)</td>
</tr>
<tr>
<td>U Wave</td>
<td>Digitalis Effects</td>
</tr>
<tr>
<td>Long Q-T</td>
<td>Quinidine Effects</td>
</tr>
<tr>
<td>Short Q-T</td>
<td>Pulmonary Emphysema</td>
</tr>
<tr>
<td>Inverted T</td>
<td>Pulmonary Infarction</td>
</tr>
<tr>
<td>Diphasic T</td>
<td>Moderately High Blood Potassium (K⁺) Concentrations</td>
</tr>
<tr>
<td>Flat T</td>
<td>Very High Blood Potassium (K⁺) Concentrations</td>
</tr>
<tr>
<td>Peaked T</td>
<td>Moderately Low Blood Potassium (K⁺) Concentrations</td>
</tr>
<tr>
<td>Slurred S-T</td>
<td>High Blood Calcium (Ca²⁺) Concentrations</td>
</tr>
<tr>
<td>Depressed S-T</td>
<td>Low Blood Calcium (Ca²⁺) Concentrations</td>
</tr>
<tr>
<td>Elevated S-T</td>
<td></td>
</tr>
<tr>
<td>Deep S</td>
<td></td>
</tr>
<tr>
<td>Wide QRS</td>
<td></td>
</tr>
<tr>
<td>Wide Significant Q</td>
<td></td>
</tr>
<tr>
<td>Tall Significant Q</td>
<td></td>
</tr>
<tr>
<td>Wide, Notched P</td>
<td></td>
</tr>
<tr>
<td>Wide Flat P</td>
<td></td>
</tr>
<tr>
<td>No P</td>
<td></td>
</tr>
</tbody>
</table>

#### Legend
- A predominant EKG pattern abnormality usually observed with the pathological condition.
- An EKG pattern abnormality that may be associated with the pathological condition.

#### 3-14
ARRHYTHMIA'S

DISTURBANCES OF HEART FUNCTIONS SUCH AS MYOCARDIAL INFARCTION (MI) CAN AFFECT THE HEART BEAT AND RELATED EKG PATTERN. THESE DISTURBANCES OF THE HEART'S RATE, RHYTHM AND CONDUCTION FUNCTIONS ARE CALLED ARRHYTHMIA'S. THEY ARE CLASSIFIED AND NAMED ON THE BASIS OF:

1. DEFECT OR PACEMAKER SITE
   - SA NODE (SINUS)
   - ATRIA
   - AV NODE (AV JUNCTION)
   - VENTRICLES

2. ABNORMAL CONDITION
   - TACHYCARDIA (FAST RATE > 100/MIN)
   - BRADYCARDIA (SLOW RATE < 60/MIN)
   - PREMATURE CONTRACTIONS OR BEATS
   - FLUTTER
   - FIBRILLATION
   - BLOCKS (CONDUCTION DEFECTS)
   - ARREST

IN ADDITION, THE ARRHYTHMIA'S ARE ALSO CLASSIFIED IN A GENERAL WAY ACCORDING TO THEIR SERIOUSNESS OR PROGNOSIS AS:

- MINOR - NOT OF IMMEDIATE CONCERN AND GENERALLY WILL NOT AFFECT CIRCULATION. HOWEVER, THEY ARE IMPORTANT BECAUSE THEY REFLECT THE IRRITABILITY OF THE HEART.
- MAJOR - THESE DISTURBANCES REDUCE THE EFFICIENCY OF THE HEART OR WARN OR IMPENDING DANGER AND REQUIRE PROMPT TREATMENT.
- DEATH PRODUCING - IMMEDIATE RESUSCITATION IS NECESSARY TO PREVENT DEATH.

A DETAILED DISCUSSION OF EACH OF THE MAJOR ARRHYTHMIAS IS INCLUDED ON THE FOLLOWING PAGES IN A STANDARD FORMAT THAT PROVIDES THESE INFORMATION ELEMENTS:

- ARRHYTHMIA REFERENCE NUMBER INCLUDED WITHIN A CODED CIRCLE SYMBOL THAT DESIGNATES ITS SERIOUSNESS.
  - ▼ = DEATH PRODUCING ARRHYTHMIA
  - ◆ = MAJOR ARRHYTHMIA
  - ◆ = MINOR ARRHYTHMIA

- VENTRICULAR RATE USUALLY ASSOCIATED WITH THE ARRHYTHMIA (SLOW, NORMAL OR RAPID)
- VENTRICULAR RHYTHM USUALLY ASSOCIATED WITH THE ARRHYTHMIA (REGULAR, IRREGULAR, SLIGHTLY IRREGULAR, OCCASIONALLY IRREGULAR, TOTALLY IRREGULAR)
- ATRIAL AND VENTRICULAR RATE RELATIONSHIPS USUALLY SEEN
- CONDUCTION PATH OF THE ARRHYTHMIA
- POSSIBLE CAUSES OF THE ARRHYTHMIA
- IDENTIFICATION ON THE ARRHYTHMIA AND IT'S CLINICAL SIGNIFICANCE
- SUMMARY OF THE COMMONLY FOLLOWED PRE-HOSPITAL TREATMENT PROTOCOLS
- TREATMENT REFERENCE NUMBER ◆ THAT REFERS TO A DETAILED DISCUSSION OF THIS TREATMENT THAT IS PRESENTED ON SUBSEQUENT PAGES.
<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>ECG Appearance and Analysis</th>
<th>Vent. Rate</th>
<th>Vent. Rhythm</th>
<th>Atrial/Vent. Rate Relation</th>
<th>Conduction Path</th>
<th>Possible Causes</th>
<th>Arrhythmia Identification and Clinical Significance</th>
<th>Summary of Commonly Followed Pre-Hospital Treatment</th>
<th>Support Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Normal Electrocardiogram</td>
<td>Normal</td>
<td>Regular</td>
<td>Same</td>
<td>Not applicable</td>
<td>Normal Sinus Rhythm</td>
<td>Normal Sinus Rhythm</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Only Abnormality is Irregular Rhythm</td>
<td>Low</td>
<td>Regular or Slightly Irregular</td>
<td>Same</td>
<td>Damage to SA Node</td>
<td>Sinus Bradycardia</td>
<td>Sinus Bradycardia</td>
<td>0.5 mg Atropine IV push every 5 min until heart rate above 70/min. Max of 2 mg.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Only Abnormality is Slow Rate</td>
<td>Normal or Low</td>
<td>Irregular</td>
<td>Same</td>
<td>Damage to SA Node</td>
<td>Sinus Arrest</td>
<td>Sinus Arrest</td>
<td>0.5 mg Atropine IV push every 5 min until heart rate above 70/min. Max of 2 mg.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Only Abnormality is Fast Rate</td>
<td>High</td>
<td>Regular</td>
<td>Same</td>
<td>Pend</td>
<td>Sinus Tachycardia</td>
<td>Sinus Tachycardia</td>
<td>Treat cause if known.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Sinus Overload</td>
<td>Normal</td>
<td>Slightly Irregular</td>
<td>Same</td>
<td>Digitalis overdose</td>
<td>Sinus Arrhythm</td>
<td>Sinus Arrhythm</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Early Abnormal P Wave Fires QRS Complex, Companatory Pause Follows</td>
<td>Normal (Usually)</td>
<td>Irregular</td>
<td>Same</td>
<td>Damage of Atrial Wall</td>
<td>Premature Atrial Contraction (PAC)</td>
<td>Premature Atrial Contraction (PAC)</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Paroxysmal Atrial Tachycardia (PAT)</td>
<td>High</td>
<td>Regular (Usually)</td>
<td>Same, if P waves may be hidden in T waves</td>
<td>Damaged SA Node or Atria</td>
<td>Pendy Atrial Tachycardia (PAT)</td>
<td>Paroxysmal Atrial Tachycardia (PAT)</td>
<td>Cardio output may significantly reduced causing B/P to fall to very low level.</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>Atrial Flutter</td>
<td>High</td>
<td>Regular (Usually)</td>
<td>Usually 2, 3, or 4 times as many P waves as QRS complexes</td>
<td>Damaged SA Node or Atria</td>
<td>Atrial Flutter</td>
<td>Atrial Flutter</td>
<td>Cardio output may significantly reduced causing B/P to fall to very low level.</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>Atrial Fibrillation</td>
<td>High, but may be normal</td>
<td>Irregular</td>
<td>Atrial rate much higher than vent rate</td>
<td>Damaged SA Node or Atria</td>
<td>Atrial Fibrillation</td>
<td>Atrial Fibrillation</td>
<td>Cardio output may significantly reduced causing B/P to fall to very low level.</td>
<td>None</td>
</tr>
<tr>
<td>REF. NO.</td>
<td>EKG APPEARANCE AND ANALYSIS</td>
<td>VENT. RATE</td>
<td>VENT. RHYTHM</td>
<td>ATRIAL/VENT. RATE RELATION</td>
<td>CONDUCTION PATH</td>
<td>POSSIBLE CAUSES</td>
<td>ARRHYTHMIA IDENTIFICATION AND CLINICAL SIGNIFICANCE</td>
<td>SUMMARY OF COMMONLY FOLLOWED PRE-HOSPITAL TREATMENT</td>
<td></td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------</td>
<td>------------</td>
<td>--------------</td>
<td>---------------------------</td>
<td>----------------</td>
<td>----------------</td>
<td>-----------------------------------------------</td>
<td>--------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>NORMAL ELECTROCARDIOGRAM</td>
<td>NORMAL</td>
<td>REGULAR</td>
<td>SAME</td>
<td></td>
<td></td>
<td>NORMAL SINUS RHYTHM</td>
<td>Not applicable</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>This is a normal Electrocardiogram</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>EARLY, ABNORMAL P WAVE FIRES QRS COMPLEXES, COMPENSATORY PAUSE FOLLOWS. P WAVE MAY BE ABSENT.</td>
<td>LOW</td>
<td>REGULAR or Slightly IRREGULAR</td>
<td>SAME (Some P waves may be absent)</td>
<td></td>
<td></td>
<td>AV NODAL RHYTHM</td>
<td>0.5 mg. Atropine IV push every 5 min. to increase heart rate to 70. (Max. of 2 mg.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cardiac output may be significantly reduced causing B/P to fall to very low level.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>May enhance electrical instability of ventricles.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>ABNORMAL P WAVES PRECEDE EACH QRS COMPLEX. FAST RATE.</td>
<td>HIGH</td>
<td>REGULAR</td>
<td>SAME (P waves may be absent)</td>
<td></td>
<td></td>
<td>AV JUNCTIONAL TACHYCARDIA</td>
<td>Cardiac Massage</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cardiac output may be significantly reduced causing B/P to fall to very low level.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>May enhance electrical instability of ventricles.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>PR INTERVAL PROLONGED OVER 21 SECOND.</td>
<td>NORMAL</td>
<td>REGULAR</td>
<td>SAME</td>
<td></td>
<td></td>
<td>1st AV BLOCK</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>May progress to 2nd or 3rd Heart Block.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>QRS COMPLEX ABSENT AFTER EVERY THIRD, FOURTH OR FIFTH P WAVE.</td>
<td>LOW or NORMAL</td>
<td>IRREGULAR (PAUSE)</td>
<td>SAME</td>
<td></td>
<td></td>
<td>2nd AV BLOCK (MOBIZIT)</td>
<td>See below</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cardiac output may be significantly reduced causing B/P to fall to very low level.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>May enhance electrical instability of ventricles.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>May progress to 3rd Heart Block.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>QRS COMPLEXES PRESENT AFTER EVERY 2ND, 3RD, OR 4TH P WAVE IN A CON-START OR VARYING RATIO</td>
<td>LOW or NORMAL</td>
<td>REGULAR or IRREGULAR</td>
<td>Atrial rate higher than vent. rate by factor of 2, 3, or 4</td>
<td></td>
<td></td>
<td>3rd AV BLOCK (MOBIZIT)</td>
<td>0.5 mg. Atropine IV push every 5 min. to increase heart rate to 70. (Max. of 2 mg.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cardiac output may be significantly reduced causing B/P to fall to very low level.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>May enhance electrical instability of ventricles.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>May progress to 3rd Heart Block.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>P WAVE'S AND QRS COMPLEXES COMPLETELY DISSOCIATED.</td>
<td>LOW</td>
<td>REGULAR</td>
<td>Completely Dissociated</td>
<td></td>
<td></td>
<td>3rd AV BLOCK</td>
<td>0.5 mg. Atropine IV push every 5 min. to increase heart rate to 70. (Max. of 2 mg.)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cardiac output may be significantly reduced causing B/P to fall to very low level.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>May enhance electrical instability of ventricles.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>May proceed Ventricular Stanstilii.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>QRS COMPLEXES WIDENED AND POSSIBLY NOTCHED</td>
<td>NORMAL</td>
<td>REGULAR</td>
<td>SAME</td>
<td></td>
<td></td>
<td>BUNDLE BRANCH BLOCK</td>
<td>None</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Not of immediate concern.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3-17
<table>
<thead>
<tr>
<th>Ref. No.</th>
<th>EKG Appearance and Analysis</th>
<th>Possible Causes</th>
<th>ARhythmia Identification and Clinical Significance</th>
<th>Summary of Commonly Followed Pre-Hospital Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Normal Sinus Rhythm</td>
<td>- Not applicable</td>
<td>- This is a normal Electrocardiogram</td>
<td>- Not applicable</td>
</tr>
<tr>
<td>11</td>
<td>Premature Ventricular Contractions (PVC's)</td>
<td>- Isolated PVC's not significant</td>
<td>- Bursts of PVC's can result in Ventricular Tachycardia or Fibrillation</td>
<td>- 50 to 75 mg. Lidocaine IV push. Repeat every 5 min. as necessary (max. of 3 doses).</td>
</tr>
<tr>
<td>13</td>
<td>Complete Tachycardia</td>
<td>- Cardiac output may be significantly reduced causing B/P to fall to very low level. May cause ischemia, AMI, shock or CHF.</td>
<td>- Death will occur if CPR and defibrillation are not administered.</td>
<td>- 50 to 75 mg. Lidocaine IV push. Repeat every 5 min. as necessary (max. of 3 doses). If victim unresponsive, give one precordial thump. If still unresponsive, give low voltage DC shock (5-50 w.s.).</td>
</tr>
<tr>
<td>14</td>
<td>Ventricular Fibrillation</td>
<td>- Death will occur if CPR and defibrillation are not administered.</td>
<td>- Death will occur if CPR and defibrillation are not administered.</td>
<td>- 50 to 75 mg. Lidocaine IV push. Repeat every 5 min. as necessary (max. of 3 doses). If victim unresponsive, give one precordial thump. If still unresponsive, give low voltage DC shock (5-50 w.s.).</td>
</tr>
<tr>
<td>15</td>
<td>Flat or Nearly Flat Baseline</td>
<td>- See below</td>
<td>- See below</td>
<td>- See below</td>
</tr>
<tr>
<td>16</td>
<td>Premature Ventricular Contraction (PVC)</td>
<td>- Digitalis, Quinidine, Procainamide, Potassium drug overdose</td>
<td>- Digitalis, Quinidine, Procainamide, Potassium drug overdose</td>
<td>- Give intracardial thump. Begin CPR. 50 ml. Sot. 100 milligram IV push every 5 min. If still unresponsive, give 5 min. Epi-epinephrine IV push. If still unresponsive, give Amiodarone CPR as necessary.</td>
</tr>
</tbody>
</table>


**RECOMMENDED PRE-HOSPITAL TREATMENTS**

**NOTE:** PRE-HOSPITAL TREATMENT IS PERFORMED IN ACCORDANCE WITH DIRECTIONS FROM THE BASE STATION DUTY PHYSICIAN. SPECIFICALLY ESTABLISHING IV'S, ADMINISTERING DRUGS AND DEFIBRILLATION WILL NOT BE PERFORMED UNLESS DIRECTED BY THE BASE STATION PHYSICIAN.

---

### 1 UNWITNESSED CARDIAC ARREST (VENTRICULAR FIBRILLATION)

<table>
<thead>
<tr>
<th>EMT</th>
<th>PARAMEDIC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **PATIENT EXAMINATION**
  - ESTABLISH - NO PULSE
  - NO RESPIRATION
  - PUPILS DILATING
  - SKIN PALE TO BLUE

- **1-MAN CPR**
  - TELECARE UNIT PREPARATIONS (EKG & COMMUN.)
  - INSTALL EKG ELECTRODES (DURING CPR VENTILATIONS)
  - VENTRICULAR FIBRILLATION IDENTIFIED
  - PREPARES DEFIBRILLATION EQUIPMENT
  - ORDERS "STAND CLEAR"

- **STANDS CLEAR**
  - DEFIBRILLATES (USUALLY @ 400 WATT-SECONDS)

- **RESUME 1-MAN CPR**
  - INSTALL IV AND ATTACH (500 ml D5W)

- **STANDS CLEAR**
  - IF NECESSARY, REPEAT DEFIBRILLATION @ (400 WATT-SECONDS) UP TO A TOTAL OF 3 TIMES

- **RESUMES 1-MAN CPR**
  - IF STILL UNSUCCESSFUL:
    - PUSH 5 ml EPINEPHRINE
    - PUSH 50 ml SODIUM BICARBONATE (EVERY 5 MINUTES AS REQUIRED)

---

### 1A WITNESSED CARDIAC ARREST (VENTRICULAR FIBRILLATION)

**ASSUMPTION:** EKG INSTALLED AND MONITORING

<table>
<thead>
<tr>
<th>EMT</th>
<th>PARAMEDIC</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **STANDS CLEAR**
  - DEFIBRILLATES (USUALLY @ 400 WATT-SECONDS)

- **BEGINS 1-MAN CPR**
  - INSTALL IV AND ATTACH (500 ml D5W)

- **STANDS CLEAR**
  - IF NECESSARY, REPEAT DEFIBRILLATIONS @ (400 WATT-SECONDS) UP TO A TOTAL OF 3 TIMES

- **RESUMES 1-MAN CPR**
  - IF STILL UNSUCCESSFUL:
    - PUSH 5 ml EPINEPHRINE
    - PUSH 50 ml SODIUM BICARBONATE (EVERY 5 MINUTES AS REQUIRED)

---

- **BEGIN 2-MAN CPR UNTIL DIRECTED TO...**

- **TRANSPORT**

---

3-19
### 2 CARDIAC ARREST (VENTRICULAR STANDSTILL)

<table>
<thead>
<tr>
<th>EMT</th>
<th>PARAMEDIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PATIENT EXAMINATION - NO PULSE</td>
<td>• TELECARE UNIT PREPARATIONS (EKG &amp; COMM.)</td>
</tr>
<tr>
<td></td>
<td>- PUPILS DILATING</td>
</tr>
<tr>
<td></td>
<td>- NO RESPIRATION</td>
</tr>
<tr>
<td></td>
<td>- SKIN PALE TO BLUE</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| • DELIVER PRECORDIAL THUMP(S) IF SUCCESSFUL | • BEGIN 2-MAN CPR UNTIL DIRECTED TO ...
| BEGIN 1-MAN CPR | • 1-MAN CPR |
| | • ADMINISTER IV DRIP ARAMINE AS DIRECTED |
| | • RESUME 2-MAN CPR UNTIL DIRECTED TO ...
| | • TRANSPORT |

### 3 VENTRICULAR TACHYCARDIA

<table>
<thead>
<tr>
<th>EMT</th>
<th>PARAMEDIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PATIENT EXAMINATION - RAPID PULSE</td>
<td>• TELECARE UNIT PREPARATIONS (EKG AND COMM.)</td>
</tr>
<tr>
<td></td>
<td>- SHORTNESS OF BREATH</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>• MONITORS PATIENT'S VITAL SIGNS</td>
<td>• INSTALL EKG ELECTRODES</td>
</tr>
<tr>
<td></td>
<td>• VENTRICULAR TACHYCARDIA IDENTIFIED</td>
</tr>
<tr>
<td></td>
<td>• INSTALL IV LINE AND ATTACH 500 ml D5W OVER 1 MINUTE PERIOD</td>
</tr>
<tr>
<td></td>
<td>• PUSH 50-75 mg LIDOCAINE SLOWLY</td>
</tr>
<tr>
<td></td>
<td>• REPEAT PUSH LIDOCAINE AS DIRECTED</td>
</tr>
<tr>
<td></td>
<td>• IF UNRESPONSIVE AND LOSES CONSCIOUSNESS: ADMINISTER PRECORDIAL THUMP</td>
</tr>
<tr>
<td>• BEGINS 1-MAN CPR</td>
<td>• IF UNRESPONSIVE; PREPARES DEFIBRILLATION EQUIPMENT</td>
</tr>
<tr>
<td></td>
<td>• IF NOT COMPLETELY UNCONSCIOUS: PUSH 5-15 mg VALIUM SLOWLY</td>
</tr>
<tr>
<td>• STANDS CLEAR</td>
<td>• ORDER &quot;STAND CLEAR&quot;</td>
</tr>
<tr>
<td></td>
<td>• DEFIBRILLATES @ MAX. 50 WATT-SECONDS</td>
</tr>
<tr>
<td></td>
<td>• REPEAT PUSH LIDOCAINE</td>
</tr>
<tr>
<td>• BEGIN 2-MAN CPR, IF REQUIRED UNTIL DIRECTED TO ...</td>
<td></td>
</tr>
<tr>
<td>• TRANSPORT</td>
<td></td>
</tr>
</tbody>
</table>
### Paroxysmal Atrial Tachycardia (PAT or AV Nodal Tachycardia)

<table>
<thead>
<tr>
<th>EMT</th>
<th>Paramedic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Examination</strong> - Rapid Pulse - Abrupt Onset Noted - Apprehensive - Low Blood Pressure (Possibly)</td>
<td></td>
</tr>
<tr>
<td><strong>Monitor Patient Signs and Assist, as Required</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Telecare Unit Preparations</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Install EKG Electrodes</strong></td>
<td></td>
</tr>
<tr>
<td><strong>PAT or AV Nodal Tachycardia Identified</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Perform Carotid Massage, as Directed</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Transport as Directed</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Premature Ventricular Contractions (PVC's)

<table>
<thead>
<tr>
<th>EMT</th>
<th>Paramedic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Examination</strong> - Pulse (Occasional Missing Beat)</td>
<td></td>
</tr>
<tr>
<td><strong>Assists, as Required</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Install IV and Attach 500 ml D5W over 1 minute period</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Push 50-75 mg Xylocaine (Lidocaine)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Repeat Push Lidocaine Every 3-5 Minutes as Directed</strong></td>
<td></td>
</tr>
</tbody>
</table>

### Complete Heart Block, 2nd° Heart Block, AV Nodal Rhythm, Sinus Bradycardia, and SA Block

<table>
<thead>
<tr>
<th>EMT</th>
<th>Paramedic</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient Examination, if;</strong> - Systolic B/P less than 80 mm Hg, or - Pulse Weak or Absent, or - Skin Pale, Cold and Clammy, or - Victim Agitated, Confused or Unconscious</td>
<td></td>
</tr>
<tr>
<td><strong>Assist as Required</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Install IV and Attach 500 ml D5W</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Arrhythmia Identified</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Push 0.5 mg Atropine</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Repeat Push Atropine Until Heart Rate is Over 70/min. as Directed (Max. 4 Times)</strong></td>
<td></td>
</tr>
<tr>
<td><strong>If Atropine Ineffective:</strong> IV Drip 2 mg Isuprel in D5W at Fast Drip Rate Until Heart Rate is Over 70/min., as Directed</td>
<td></td>
</tr>
</tbody>
</table>
ARRHYTHMIA SUMMARY INDEX

<table>
<thead>
<tr>
<th>VENT. RATE</th>
<th>IRREGULAR</th>
<th>DEFECT TYPE</th>
<th>CONDUCTION</th>
<th>IMPULSE FORMATION</th>
<th>DEFECT TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>VENTRICULAR FIBRILLATION</td>
<td>1</td>
<td>1</td>
<td>VENTRICULAR FIBRILLATION</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>ATRIAL FIBRILLATION</td>
<td>0</td>
<td>0</td>
<td>ATRIAL FIBRILLATION</td>
<td>0</td>
</tr>
<tr>
<td>NORMAL</td>
<td>SINUS ARRHYTHMIA</td>
<td>1</td>
<td>1</td>
<td>PVC</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>PVC</td>
<td>18</td>
<td>18</td>
<td>PVC</td>
<td>18</td>
</tr>
<tr>
<td>LOW</td>
<td>PVC</td>
<td>18</td>
<td>18</td>
<td>PVC</td>
<td>18</td>
</tr>
<tr>
<td>ZERO</td>
<td>PRIMARY VENT. STANDSTILL</td>
<td>2</td>
<td>2</td>
<td>PRIMARY VENT. STANDSTILL</td>
<td>2</td>
</tr>
</tbody>
</table>

**VENTRICULAR RHYTHM**

- OCCASIONALLY IRREGULAR
- SLIGHTLY IRREGULAR

**DEFECT TYPE**

- DEATH PRODUCING ARRHYTHMIA
- MAJOR ARRHYTHMIA
- MINOR ARRHYTHMIA

**CRITICALLY CLASSIFICATION**

- DEATH PRODUCING ARRHYTHMIA
- MAJOR ARRHYTHMIA
- MINOR ARRHYTHMIA

- BASALINE ONLY
<table>
<thead>
<tr>
<th>Occasionaly Irregular or Slightly Irregular</th>
<th>Regular</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formation</td>
<td>Conduction</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>Pats</td>
</tr>
<tr>
<td>AV Nodal Tachycardia</td>
<td>P Waves May Be Absent, or PR Interval Less Than 0.2 Seconds</td>
</tr>
<tr>
<td>Bundle Branch Block</td>
<td>All QRS Complexes Slightly Widened</td>
</tr>
<tr>
<td>3rd AV Block</td>
<td>Completely Independent Atrial and Ventricular Rates</td>
</tr>
</tbody>
</table>
DRUGS/INTRAVENOUS (IV) FLUIDS
EQUIPMENT AND ADMINISTRATION

### DRUGS/FLUIDS ADMINISTERED
BY "IV PUSH"

<table>
<thead>
<tr>
<th>DRUGS/FLUIDS ADMINISTERED</th>
<th>MGM/ML</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADRENALIN (EPINEPHRINE)</td>
<td>1/10</td>
</tr>
<tr>
<td>ATROPINE</td>
<td>1/10</td>
</tr>
<tr>
<td>LIDOCAINE</td>
<td>100/10</td>
</tr>
<tr>
<td>VALIUM</td>
<td>10/2</td>
</tr>
<tr>
<td>SODIUM BICARBONATE</td>
<td></td>
</tr>
<tr>
<td>50% DEXTROSE IN .2% NORMAL SALINE</td>
<td></td>
</tr>
</tbody>
</table>

### DRUGS ADMINISTERED
BY "IV DRIP" ONLY

<table>
<thead>
<tr>
<th>DRUGS/FLUIDS ADMINISTERED</th>
<th>MGM/ML</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARamine</td>
<td>100/10</td>
</tr>
<tr>
<td>ISUPREL</td>
<td></td>
</tr>
</tbody>
</table>

### IV FLUIDS

- 5% DEXTROSE IN .2% NORMAL SALINE
- 5% DEXTROSE IN WATER
- RINGER'S LACTATE

---

*(THE LARGER THE GAUGE NUMBER THE SMALLER THE NEEDLE DIAMETER)
Syringe Procedures

Prepackaged Two Sterile Sections Drugs

1. Remove syringe cap

2. Rotate vial (ampl) three turns clockwise until resistance is felt. (Syringe injector is then into drug solution)

3. Remove needle cover

4. Push vial in to flush air out of syringe

5. Inject, as required.

---

Prepackaged Sterile One-Section Syringe

1. Select empty, sterile syringe and remove needle cover

2. Cover vial with sterile gauze pad and break vial glass neck

3. Aspirate drug solution from vial and tip vial to get all solution

4. Hold syringe, needle up

5. Tap syringe and push plunger in slightly to remove air bubbles. Push plunger until all air space is removed

6. Inject, as required (replace cover if immediate injection not required)
IV INSTALLATION - DRUG ADMINISTRATION - IV REMOVAL

**CAUTION**
A major concern throughout IV and Drug Administration is to maintain sterile NEEDLES, ADAPTERS and INJECTION SITES (victim's and on IV equip.)

**OBTAIN:**
- IV Set
- Butterfly Needle or Straight Needle and Catheter
- Adhesive Tape (1/2" wide)
- Arm Board (short)

<table>
<thead>
<tr>
<th>PREPARE IV ADMINISTRATION SET</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A</strong> OPEN IV SET AND CONNECT TO IV FLUID BAG</td>
</tr>
<tr>
<td>1. REMOVE VENIPACK FROM PACKAGE.</td>
</tr>
<tr>
<td>2. CLOSE FLOW CLAMP.</td>
</tr>
<tr>
<td><strong>C</strong> FLUSH AND PRIME IV TUBING</td>
</tr>
<tr>
<td>1. REMOVE COVER FROM NEEDLE ADAPTER</td>
</tr>
<tr>
<td>2. OPEN FLOW CLAMP RAPIDLY TO &quot;OPEN&quot;</td>
</tr>
<tr>
<td>3. CLOSE FLOW CLAMP.</td>
</tr>
</tbody>
</table>

4. INVERT IV BAG AND HANG ON ELEVATED SUPPORT. (THIS ALLOWS FLUID TO FLOW INTO IV TUBING UP TO THE FLOW CLAMP.)
### PREPARE INJECTION SITE

<table>
<thead>
<tr>
<th>DISTEND VEINS AT INJECTION SITE</th>
<th>IV SITES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FIRST PREFERENCE:</strong> WRIST OR BACK OF HAND SITES</td>
<td></td>
</tr>
<tr>
<td><strong>SECOND PREFERENCE:</strong> FOREARM SITES</td>
<td></td>
</tr>
</tbody>
</table>

**D**

**1.** Let arm hand off-stretcher below body level.

**2.** Apply tourniquet to:
- **Upperarm** - If wrist IV site
- **Forearm** - If forearm IV site

It should be tight enough to block venous flow but not arterial flow. Radial pulse should still be felt.

**3.** If possible, have victim make fist. (Alternately close- open, then close until needle in vein)

**4.** Slap or thump vein lightly over injection site.

**E**

**1.** Cleanse and prep the skin with disinfectant pad. (Apply in a gradually widening circle, then close until needle in vein. Cleanse out approx. inches in diameter.)

---

**FIRST PREFERENCE:**

- **Basilic Vein**
- **Cephalic Vein**
- **Dorsal Venous Arch**
- **Metacarpal Veins**

**SECOND PREFERENCE:**

- **Basilic Vein**
- **Cephalic Vein**
- **Brachial Artery**
- **Median Antebrachial Vein**
# Venipuncture and IV Installation

### Using Syringe, Needle & Catheter

1. **Select Medicut Assy** (Syringe/Needle/Catheter) of Required Gauge, Remove Covers
2. **Stabilize Vein**
   - Position Needle Barely to One Side of Vein, 1/2" Below Puncture Site
   - Devel Up, In Direction of Shoulder
3. **Position Needle**
   - Pierce Skin and Underlying Tissue to Reach But Not Penetrate Skin
4. **Pierce Vein and Verify Entry by Blood in Syringe When It is Aspirated**
5. **Carefully Advance Needle Into Vein**, Applying Upward Pressure to Prevent Piercing of Opposite Side of Vein
6. **Remove Syringe and Connect Reprimed IV Line Adapter to Catheter That Remains in Vein**
7. **Release Tourniquet**
8. **Tape Butterfly Needle in Place**
9. **Tape Tubing Above Adapter To Prevent Stress on Butterfly**
10. **Set IV Flow Rate As Required**

### Using Butterfly Needle

1. **Remove Butterfly Needle Cover**
2. **Grasp Patient's Hand with Your Left Hand (If You Are Right Handed)**
3. **Position Your Thumb Below Injection Site**
4. **Stretch Skin Surface Taut to Anchor Veins**
5. **Grasp Wings and Position Needle Same as Indicated in Straight Needle Procedure**
6. **Pierce Skin and Underlying Tissue to Reach But Not Penetrate Skin**
7. **Lower Needle Until flush With Skin**
   - Move Needle Tip Directly Over Vein
8. **Pierce Vein and Verify Entry By Flashhock Thru Female Adapter**
9. **Carefully Advance Needle Into Vein**, Applying Upward Pressure to Prevent Piercing of Opposite Side of Vein
10. **Connect Reprimed IV Male Needle Adapter To Female Adapter of Butterfly**
11. **Release Tourniquet**
12. **Tape Catheter**
13. **Tape Tubing To Prevent Stress On Catheter**
14. **Set IV Flow Rate As Required**
15. **Tape the Arm Firmly To The Arm Board To Stabilize For Transport**
IV DRUG ADMINISTRATION

**G**

1. Close FLOW CLAMP.
2. Clean drug injection site (BULB OR INJECTOR SITE) with disinfectant pad.
3. Inject DRUG from SYRINGE into (BULB OR INJECTOR SITE) at the prescribed rate.
4. Remove SYRINGE after administration.
5. Open FLOW CLAMP and adjust flow rate to 2 drops per second for 1/2 minute (to flush medication).
6. Readjust FLOW CLAMP to previous rate.

**H**

1. Close FLOW CLAMP.
2. Clean IV FLUID BAG INJECTION SITE with DISINFECTANT PAD.
3. Inject DRUG from SYRINGE into IV BAG INJECTION SITE.
4. Remove SYRINGE.
5. Shake IV FLUID BAG to mix drug with IV fluid.
6. Open and adjust FLOW CLAMP to prescribed flow rate.

**I**

1. Close FLOW CLAMP.
2. Remove TAPE attaching BUTTERFLY NEEDLE or CATHETER to skin.
3. Press a DRY STERILE GAUZE over NEEDLE AND INJECTION SITE.
4. Remove NEEDLE OR CATHETER rapidly from vein keeping shaft parallel to skin and vein.
5. Maintain pressure with GAUZE for several minutes until bleeding stops.
6. Cover injection site with a BAND-AID.
<table>
<thead>
<tr>
<th>DRUG/IV FLUID</th>
<th>NAME</th>
<th>ADRENALIN (EPINEPHRINE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>QTY/FORM</td>
<td>(2)</td>
<td>Vial/Syringes</td>
</tr>
<tr>
<td>ITEM VOLUME/SIZE</td>
<td>10 ml.</td>
<td></td>
</tr>
<tr>
<td>STRENGTH/ITEM VOLUME</td>
<td>1 mg./10 ml.</td>
<td></td>
</tr>
<tr>
<td>STRENGTH/UNIT VOLUME</td>
<td>1 mg./ml.</td>
<td></td>
</tr>
<tr>
<td>USUAL DOSAGE:</td>
<td>5 ml. IV push every 5 minutes during CPR.</td>
<td></td>
</tr>
<tr>
<td>POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:</td>
<td>Anxiety, Headache, Rapid, strong pulse, Fear, Administer with caution to elderly, hypertensives, diabetics, or victims with cardiovascular disease, Do not use if solution is brown, Protect from light until ready for use.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DRUG/IV FLUID</th>
<th>NAME</th>
<th>ARAMINE (METARAMINOL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>QTY/FORM</td>
<td>(2)</td>
<td>Vial/Syringes</td>
</tr>
<tr>
<td>ITEM VOLUME/SIZE</td>
<td>10 ml.</td>
<td></td>
</tr>
<tr>
<td>STRENGTH/ITEM VOLUME</td>
<td>100 mg./10 ml.</td>
<td></td>
</tr>
<tr>
<td>STRENGTH/UNIT VOLUME</td>
<td>10 mg./ml.</td>
<td></td>
</tr>
<tr>
<td>USUAL DOSAGE:</td>
<td>15 to 100 mg, diluted in 500 ml., of 5% Dextrose and water or saline solutions. Infuse mixture at rate to maintain systolic B/P between 100 and 120.</td>
<td></td>
</tr>
<tr>
<td>POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:</td>
<td>Hypertension, Cardiac arrhythmias, Cardiac arrest, Headache, Flushing, Apprehension, Dizziness, Strong, rapid pulse, Do not administer to victim in shock due to blood loss.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DRUG/IV FLUID</th>
<th>NAME</th>
<th>ATROPINE</th>
</tr>
</thead>
<tbody>
<tr>
<td>QTY/FORM</td>
<td>(2)</td>
<td>Vial/Syringes</td>
</tr>
<tr>
<td>ITEM VOLUME/SIZE</td>
<td>10 ml.</td>
<td></td>
</tr>
<tr>
<td>STRENGTH/ITEM VOLUME</td>
<td>1 mg./10 ml.</td>
<td></td>
</tr>
<tr>
<td>STRENGTH/UNIT VOLUME</td>
<td>1 mg./ml.</td>
<td></td>
</tr>
<tr>
<td>USUAL DOSAGE:</td>
<td>.5 mg. IV push at 5 minute intervals until pulse rate is greater than 60. Total dose not to exceed 2 mg.</td>
<td></td>
</tr>
<tr>
<td>POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:</td>
<td>Dryness of mouth or nose, Dizziness, Hallucinations, Blurred vision, Drowsiness, Rash, Rapid, strong pulse, Nausea, Tachycardia, Do not exceed recommended dosage, Atropine poisoning can be fatal, May cause ventricular arrhythmias.</td>
<td></td>
</tr>
<tr>
<td>DRUG/IV FLUID</td>
<td>PURPOSE/TREATMENT</td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>------------------</td>
<td></td>
</tr>
<tr>
<td>NAME</td>
<td>DEXTROSE 50%</td>
<td></td>
</tr>
<tr>
<td>QTY/FORM</td>
<td>(2) Vial/Syringes</td>
<td></td>
</tr>
<tr>
<td>ITEM VOLUME/SIZE</td>
<td>50 ml.</td>
<td></td>
</tr>
<tr>
<td>STRENGTH/ITEM VOLUME</td>
<td>25 mg./50 ml.</td>
<td></td>
</tr>
<tr>
<td>STRENGTH/UNIT VOLUME</td>
<td>0.5 mg./ml.</td>
<td></td>
</tr>
<tr>
<td>USUAL DOSAGE:</td>
<td>POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:</td>
<td></td>
</tr>
</tbody>
</table>

- Insulin shock

<table>
<thead>
<tr>
<th>DRUG/IV FLUID</th>
<th>PURPOSE/TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>DEXTROSE AND WATER (D5W)</td>
</tr>
<tr>
<td>QTY/FORM</td>
<td>(6) Bags 5% Dextrose in Distilled Water</td>
</tr>
<tr>
<td>ITEM VOLUME/SIZE</td>
<td>500 ml.</td>
</tr>
<tr>
<td>STRENGTH/ITEM VOLUME</td>
<td></td>
</tr>
<tr>
<td>STRENGTH/UNIT VOLUME</td>
<td></td>
</tr>
<tr>
<td>USUAL DOSAGE:</td>
<td>POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:</td>
</tr>
</tbody>
</table>

- Transport medium for IV drugs
- Supplies nutrient to blood
- Helps supply energy to tissues deficient in oxygen.

<table>
<thead>
<tr>
<th>DRUG/IV FLUID</th>
<th>PURPOSE/TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>DEXTROSE IN SALINE SOLUTION</td>
</tr>
<tr>
<td>QTY/FORM</td>
<td>(4) Bags 5%/2N Saline Solution</td>
</tr>
<tr>
<td>ITEM VOLUME/SIZE</td>
<td></td>
</tr>
<tr>
<td>STRENGTH/ITEM VOLUME</td>
<td></td>
</tr>
<tr>
<td>STRENGTH/UNIT VOLUME</td>
<td></td>
</tr>
<tr>
<td>USUAL DOSAGE:</td>
<td>POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:</td>
</tr>
</tbody>
</table>

- Transport medium for IV drugs
- Supplies nutrients to blood
- Helps supply energy to tissues deficient in oxygen.

- Normally not used in cardiac cases.

Infuse slowly to keep vein open.
<table>
<thead>
<tr>
<th>DRUG/IV FLUID</th>
<th>PURPOSE/TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NAME</strong> ISUPREL (ISOPROTERENOL)</td>
<td>To increase heart rate.</td>
</tr>
<tr>
<td><strong>QTY/FORM</strong> Ampules</td>
<td>Cardiac Standstill</td>
</tr>
<tr>
<td><strong>ITEM VOLUME/SIZE</strong> 5 ml.</td>
<td>Shock</td>
</tr>
<tr>
<td><strong>STRENGTH/ITEM VOLUME</strong> 1 mg./5 ml.</td>
<td>Bronchospasms</td>
</tr>
<tr>
<td><strong>STRENGTH/UNIT VOLUME</strong> .2 mg./ml.</td>
<td>Bradycardia (caused by complete heart block or when atropine is ineffective)</td>
</tr>
<tr>
<td><strong>USUAL DOSAGE:</strong> Dilute one full ampul in 500 ml. 5% Dextrose and water and infuse mixture at 1 ml./min.</td>
<td>• Sweating</td>
</tr>
<tr>
<td></td>
<td>• Headache</td>
</tr>
<tr>
<td></td>
<td>• Tachycardia</td>
</tr>
<tr>
<td></td>
<td>• Flushed face</td>
</tr>
<tr>
<td></td>
<td>• Nervousness</td>
</tr>
<tr>
<td></td>
<td>• Strong, rapid pulse</td>
</tr>
<tr>
<td></td>
<td>• Decrease infusion rate if pulse is above 110.</td>
</tr>
<tr>
<td></td>
<td>• Use with extreme caution in victim with myocardial infarction.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DRUG/IV FLUID</th>
<th>PURPOSE/TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NAME</strong> NITROGLYCERINE (NITROSTAT)</td>
<td>Vasodilator</td>
</tr>
<tr>
<td><strong>QTY/FORM</strong> Bottle Tablets</td>
<td>Angina</td>
</tr>
<tr>
<td><strong>ITEM VOLUME/SIZE</strong></td>
<td></td>
</tr>
<tr>
<td><strong>STRENGTH/ITEM VOLUME</strong> .4 mg./Tablet</td>
<td></td>
</tr>
<tr>
<td><strong>STRENGTH/UNIT VOLUME</strong></td>
<td></td>
</tr>
<tr>
<td><strong>USUAL DOSAGE:</strong> .4 mg. taken orally.</td>
<td>• Blurred vision</td>
</tr>
<tr>
<td></td>
<td>• Dizziness</td>
</tr>
<tr>
<td></td>
<td>• Drying of mouth</td>
</tr>
<tr>
<td></td>
<td>• Weakness</td>
</tr>
<tr>
<td></td>
<td>• Excessive dosage may cause violent headache.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DRUG/IV FLUID</th>
<th>PURPOSE/TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NAME</strong> RINGERS LACTATE</td>
<td>Fluid volume builder</td>
</tr>
<tr>
<td><strong>QTY/FORM</strong> Bags</td>
<td>Replace lost electrolytes</td>
</tr>
<tr>
<td><strong>ITEM VOLUME/SIZE</strong> 1000 ml.</td>
<td>Hypovolemic shock</td>
</tr>
<tr>
<td><strong>STRENGTH/ITEM VOLUME</strong></td>
<td>Hemorrhage</td>
</tr>
<tr>
<td><strong>STRENGTH/UNIT VOLUME</strong></td>
<td></td>
</tr>
<tr>
<td><strong>USUAL DOSAGE:</strong> Infuse rapidly.</td>
<td>• Electrolyte imbalance</td>
</tr>
<tr>
<td></td>
<td>• Do not use in cardiac cases.</td>
</tr>
</tbody>
</table>
DRUG/IV FLUID DATA
(ARRANGED ALPHABETICALLY BY DRUG NAME)
NOTE: ADMINISTRATION SHALL BE ONLY AS DIRECTED BY DUTY PHYSICIAN

<table>
<thead>
<tr>
<th>DRUG/IV FLUID</th>
<th>PURPOSE/TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>SODIUM BICARBONATE</td>
</tr>
<tr>
<td>QTY/FORM</td>
<td>(4) Vial/Syringes</td>
</tr>
<tr>
<td>ITEM VOLUME/SIZE</td>
<td>50 ml.</td>
</tr>
<tr>
<td>STRENGTH/ITEM VOLUME</td>
<td>3.75 gm/50 ml.</td>
</tr>
<tr>
<td>STRENGTH/UNIT VOLUME</td>
<td>75 mg./ml.</td>
</tr>
<tr>
<td>USUAL DOSAGE:</td>
<td>3.75 gm. for every 5 minutes of shock or cardiac arrest. Do not exceed 3 syringes.</td>
</tr>
<tr>
<td>POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS:</td>
<td>In cardiac arrest, sodium bicarbonate should be given in conjunction with epinephrine - never alone.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DRUG/IV FLUID</th>
<th>PURPOSE/TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>VALIUM (DIAZEPAM)</td>
</tr>
<tr>
<td>QTY/FORM</td>
<td>(2) Vial/Syringes</td>
</tr>
<tr>
<td>ITEM VOLUME/SIZE</td>
<td>2 ml.</td>
</tr>
<tr>
<td>STRENGTH/ITEM VOLUME</td>
<td>10 mg./2 ml.</td>
</tr>
<tr>
<td>STRENGTH/UNIT VOLUME</td>
<td>5 mg./ml.</td>
</tr>
<tr>
<td>USUAL DOSAGE:</td>
<td>5 to 15 mg. @ 5 mg./min. IV push within 5 to 10 minutes prior to defibrillation. For anxiety or stress, 5 to 10 mg. @ 5 mg./min.</td>
</tr>
</tbody>
</table>
| POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS: | Hypotension • Hiccups • Fatigue
Muscle weakness • Drowsiness • Nausea
Do not administer to victim in coma. |

<table>
<thead>
<tr>
<th>DRUG/IV FLUID</th>
<th>PURPOSE/TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>XYLOCAINE (LIDOCAINE)</td>
</tr>
<tr>
<td>QTY/FORM</td>
<td>(4) Vial/Syringes</td>
</tr>
<tr>
<td>ITEM VOLUME/SIZE</td>
<td>10 ml.</td>
</tr>
<tr>
<td>STRENGTH/ITEM VOLUME</td>
<td>100 mg./10 ml.</td>
</tr>
<tr>
<td>STRENGTH/UNIT VOLUME</td>
<td>10 mg./ml.</td>
</tr>
<tr>
<td>USUAL DOSAGE:</td>
<td>50 to 100 mg. IV push in 1 to 2 minutes. Second dose may be repeated after 5 minutes.</td>
</tr>
</tbody>
</table>
| POSSIBLE SIDE EFFECTS/CAUTIONS/REMARKS: | Dizziness • Convulsions • Bradycardia
Apprehension • Respiratory Depression
Blurred Vision • Hypotension
Constant monitoring of EKG required.
Resuscitative equipment should be immediately available. |
DRUGS THAT ALTER RATE OF HEARTBEAT

<table>
<thead>
<tr>
<th>INFLUENCES</th>
<th>LOCATIONS/RATE EFFECT</th>
<th>DRUG</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDUCTION</td>
<td>THROUGH AV NODE ▲</td>
<td>ISUPREL</td>
</tr>
<tr>
<td></td>
<td>THROUGH AV NODE ▲</td>
<td>ATROPINE</td>
</tr>
<tr>
<td>IMPULSE FORMATION</td>
<td>IN SA NODE ▲</td>
<td>ARAMINE</td>
</tr>
<tr>
<td></td>
<td>IN SA OR AV NODE ▲</td>
<td>ATROPINE</td>
</tr>
</tbody>
</table>
|                 | SA NODE, AV NODE OR HIS/PURKINJE SYSTEM| EPINEPHRINE|^
|                 | HIS/PURKINJE SYSTEM OR VENTRICLES      | LIDOCAINE  |

DRUGS THAT AFFECT BLOOD PRESSURE

<table>
<thead>
<tr>
<th>EFFECT</th>
<th>DRUG</th>
</tr>
</thead>
<tbody>
<tr>
<td>INCREASE ▲</td>
<td>ARAMINE</td>
</tr>
<tr>
<td></td>
<td>ATROPINE (PRONE VICTIM ONLY)</td>
</tr>
<tr>
<td></td>
<td>EPINEPHRINE (SYSTOLIC ONLY)</td>
</tr>
<tr>
<td></td>
<td>IV FLUIDS (POSSIBLY)</td>
</tr>
<tr>
<td></td>
<td>SODIUM BICARBONATE</td>
</tr>
<tr>
<td>DECREASE ▼</td>
<td>ISUPREL (POSSIBLY)</td>
</tr>
<tr>
<td></td>
<td>LIDOCAINE (SLIGHTLY)</td>
</tr>
<tr>
<td></td>
<td>VALIUM (POSSIBLY)</td>
</tr>
</tbody>
</table>
### Types of Emergencies and Emergencies

<table>
<thead>
<tr>
<th>EMERGENCY TYPE</th>
<th>IMPACT</th>
<th>BURNS</th>
<th>ELECTRIC SHOCK</th>
<th>DROWNING</th>
<th>SHOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPICAL CAUSES</td>
<td>MOTOR VEHICLE/BOATING</td>
<td>FIRES</td>
<td>ELECTRICAL EQUIP.</td>
<td>BOATING</td>
<td>IMPACT</td>
</tr>
<tr>
<td></td>
<td>GUNSHOT/STAB/SLASH</td>
<td>EXPLOSIONS</td>
<td>CONTACT</td>
<td>SWIMMING</td>
<td>BURNS</td>
</tr>
<tr>
<td></td>
<td>EXPLOSION</td>
<td>KITCHEN</td>
<td>LIGHTNING</td>
<td>ELECTRICAL</td>
<td>ELECTRICAL</td>
</tr>
<tr>
<td></td>
<td>MACHINERY</td>
<td>ACCIDENTS</td>
<td></td>
<td>EQUIPMENT</td>
<td>GUN</td>
</tr>
<tr>
<td></td>
<td>FALL</td>
<td></td>
<td></td>
<td></td>
<td>CARDIAC</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXPECTED EMERGENCIES</th>
<th>SOFT TISSUE INJURIES</th>
<th>SOFT TISSUE INJURIES</th>
<th>SOFT TISSUE INJURIES</th>
<th>SOFT TISSUE INJURIES</th>
<th>CARDIAC/CIRCULATION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RESPIRATION</td>
<td>LONG DAMAGE</td>
<td>RESPIRATION</td>
<td>LONG DAMAGE</td>
<td>RESPIRATION</td>
</tr>
<tr>
<td></td>
<td>- AIRWAY BLOCKAGE</td>
<td></td>
<td>- CHEST INJURIES</td>
<td></td>
<td>- CHEST INJURIES</td>
</tr>
<tr>
<td></td>
<td>- BLEEDING</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>EXT. OR INTERNAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- SHOCK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>- CARDIAC</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EMT EMERGENCY ACTIONS</th>
<th>X = PROBABLY REQUIRED</th>
</tr>
</thead>
<tbody>
<tr>
<td>RESPIRATION SUPPORT</td>
<td></td>
</tr>
<tr>
<td>1 MOUTH-TO-MOUTH</td>
<td>X</td>
</tr>
<tr>
<td>2 BAG</td>
<td>X</td>
</tr>
<tr>
<td>3 ORAL AIRWAY</td>
<td>X</td>
</tr>
<tr>
<td>4 OXYGEN</td>
<td>X</td>
</tr>
<tr>
<td>5 SUCTION</td>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>HEART/ CIRCULATION SUPPORT</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>6 EXTERNAL MASSAGE</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>7 PRE-CORDIAL THUMP</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>8 IV-DRUGS</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>9 EKG</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>10 DEFIBRILLATE</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TRAUMA/ INJURY SUPPORT</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>11 CONTROL BLEEDING</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>12 SPLINTING/BANDAGING</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>13 BURN BANDAGING</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>OTHER SUPPORT</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>14 RESTRAINT</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>15 EXTRICATION</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>16 CHILDBIRTH ASSISTANCE</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>17 SYRUP OF IPECAC</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>18 GAG IN MOUTH</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>
### MEDICAL EMERGENCIES

<table>
<thead>
<tr>
<th>EMERGENCY</th>
<th>SHOCK</th>
<th>CARDIAC</th>
<th>STROKE</th>
<th>CONVULSIONS</th>
<th>PSYCHIATRIC</th>
<th>OBSTETRICS</th>
<th>POISONINGS AND DRUG O.D.</th>
<th>DIABETIC STATES</th>
<th>ACUTE ABDOMEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock</td>
<td>Impact</td>
<td>Heart Arrest</td>
<td>Cerebral Blood Clot or Hemorrhage</td>
<td>Epileptic Injury or Infection</td>
<td>Mentally Disturbed Victims</td>
<td>Childbirth</td>
<td>Ingestion</td>
<td>Too Low Blood Insulin</td>
<td>Appendicitis</td>
</tr>
<tr>
<td>Burns</td>
<td>Congestive</td>
<td>Heart Failure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Inhalation</td>
<td>Too High Blood Insulin</td>
<td>Ulcers</td>
</tr>
<tr>
<td>Electrical</td>
<td>Angina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Absorption</td>
<td></td>
<td>Gallbladder</td>
</tr>
<tr>
<td>Cardiac</td>
<td>Myocardial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Injection</td>
<td></td>
<td>Bile Infection</td>
</tr>
<tr>
<td>Injury</td>
<td>Infarction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerebral</td>
<td>Blood Clot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemorrhage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disturbed</td>
<td>Victims</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MENTALLY DISTURBED</td>
<td>VICTIMS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock</td>
<td>Impact</td>
<td>Heart Arrest</td>
<td>Cerebral Blood Clot or Hemorrhage</td>
<td>Epileptic Injury or Infection</td>
<td>Mentally Disturbed Victims</td>
<td>Childbirth</td>
<td>Ingestion</td>
<td>Too Low Blood Insulin</td>
<td>Appendicitis</td>
</tr>
<tr>
<td>Burns</td>
<td>Congestive</td>
<td>Heart Failure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Inhalation</td>
<td>Too High Blood Insulin</td>
<td>Ulcers</td>
</tr>
<tr>
<td>Electrical</td>
<td>Angina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Absorption</td>
<td></td>
<td>Gallbladder</td>
</tr>
<tr>
<td>Cardiac</td>
<td>Myocardial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Injection</td>
<td></td>
<td>Bile Infection</td>
</tr>
<tr>
<td>Injury</td>
<td>Infarction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerebral</td>
<td>Blood Clot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemorrhage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disturbed</td>
<td>Victims</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VENTILATING</td>
<td>SHOCKING</td>
<td>HEART ARREST</td>
<td>CEREBRAL BLOOD CLOT OR HEMORRHAGE</td>
<td>EPILEPTIC INJURY OR INFECTION</td>
<td>MENTALLY DISTURBED VICTIMS</td>
<td>CHILDbirth</td>
<td>INGESTION</td>
<td>TOO LOW BLOOD INSULIN</td>
<td>APPENDICITIS</td>
</tr>
<tr>
<td>STUNT CLIMBING</td>
<td>BURNS</td>
<td>HEART FAILURE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>INHALATION</td>
<td>TOO HIGH BLOOD INSULIN</td>
<td>ULCERS</td>
</tr>
<tr>
<td>ELECTRICAL</td>
<td>ANGINA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ABSORPTION</td>
<td></td>
<td>GALLBLADDER</td>
</tr>
<tr>
<td>CARDIAC</td>
<td>MYOCARDIAL</td>
<td>INFARCTION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>INJECTION</td>
<td></td>
<td>BILE INFECTION</td>
</tr>
<tr>
<td>INJURY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerebral</td>
<td>Blood Clot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemorrhage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disturbed</td>
<td>Victims</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shock</td>
<td>Impact</td>
<td>Heart Arrest</td>
<td>Cerebral Blood Clot or Hemorrhage</td>
<td>Epileptic Injury or Infection</td>
<td>Mentally Disturbed Victims</td>
<td>Childbirth</td>
<td>Ingestion</td>
<td>Too Low Blood Insulin</td>
<td>Appendicitis</td>
</tr>
<tr>
<td>Burns</td>
<td>Congestive</td>
<td>Heart Failure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Inhalation</td>
<td>Too High Blood Insulin</td>
<td>Ulcers</td>
</tr>
<tr>
<td>Electrical</td>
<td>Angina</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Absorption</td>
<td></td>
<td>Gallbladder</td>
</tr>
<tr>
<td>Cardiac</td>
<td>Myocardial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Injection</td>
<td></td>
<td>Bile Infection</td>
</tr>
<tr>
<td>Injury</td>
<td>Infarction</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerebral</td>
<td>Blood Clot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemorrhage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disturbed</td>
<td>Victims</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VENTILATING</td>
<td>SHOCKING</td>
<td>HEART ARREST</td>
<td>CEREBRAL BLOOD CLOT OR HEMORRHAGE</td>
<td>EPILEPTIC INJURY OR INFECTION</td>
<td>MENTALLY DISTURBED VICTIMS</td>
<td>CHILDbirth</td>
<td>INGESTION</td>
<td>TOO LOW BLOOD INSULIN</td>
<td>APPENDICITIS</td>
</tr>
<tr>
<td>STUNT CLIMBING</td>
<td>BURNS</td>
<td>HEART FAILURE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>INHALATION</td>
<td>TOO HIGH BLOOD INSULIN</td>
<td>ULCERS</td>
</tr>
<tr>
<td>ELECTRICAL</td>
<td>ANGINA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ABSORPTION</td>
<td></td>
<td>GALLBLADDER</td>
</tr>
<tr>
<td>CARDIAC</td>
<td>MYOCARDIAL</td>
<td>INFARCTION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>INJECTION</td>
<td></td>
<td>BILE INFECTION</td>
</tr>
<tr>
<td>INJURY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerebral</td>
<td>Blood Clot</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hemorrhage</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infection</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disturbed</td>
<td>Victims</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Actions:
- X DUE TO IMPACT INJURIES
- DO NOT RESTRAIN
- PROTECT VICTIM FROM ENVIRONMENT
- X INDUCE VOMITING
- DO NOT GIVE ANYTHING BY MOUTH
- X-50% DEXTROSE

**5-1**
IMPORTANT SIGNS AND THEIR INTERPRETATION

**SKIN COLOR** (PARTICULARLY OF LIPS, FINGERNAILS)
- DEPENDS ON PIGMENT AND AMOUNT OF CIRCULATING BLOOD IN TISSUES
  - **COLOR:**
  - **RED OR FLUSH** - HIGH BLOOD PRESSURE
  - CARBON MONOXIDE POISONING
  - HEAT STROKE
  - **PALE, ASHEN WHITE** - INSUFFICIENT CIRCULATION (AS IN EARLY STAGES OF "SHOCK" OR HEART FAILURE)
  - IN CERTAIN STAGES OF FRIGHT
  - **BLUSH (CYANOTIC)** - LACK OF OXYGEN IN BLOOD AND/OR INSUFFICIENT CIRCULATION (AS IN LATTER STAGES OF SHOCK AND HEART FAILURE)
  - **YELLOWISH** - A SIGN OF LIVER OR BILE DUCT DISEASE

**RESPIRATION**
- NORMAL RATE = 1 BREATH EVERY 3-4 SECONDS (ADULTS)
- AUTOMATICALLY CONTROLLED BY NERVOUS SYSTEM IN RESPONSE TO \( \text{CO}_2 \) CONTENT OF BLOOD
  - BODILY \( \text{O}_2 \) REQUIREMENTS
  - RATE AND DEPTH OF RESPIRATION ARE IMPORTANT
  - RAPID/SHALLOW BREATHING - SEEN IN "SHOCK" AND HEAD INJURIES
  - INSPIRATION "CRAUGHING" (STROUDER)
  - DEEP/LABORED/WHEEZING - SEEN IN: UPPER AIRWAY OBSTRUCTION AND SEVERE ALLERGY SHOCK
  - DEEP/GASPING/LABORED - SEEN IN HEART PROBLEMS
  - COUGHING AND FROTHY BLOOD - LUNG DAMAGE FROM FRACTURED RIBS OR FOREIGN BODIES PENETRATING CHEST

**BLOOD PRESSURE**
- NORMAL SYSTOLIC: 110 - 140
- DIASTOLIC: 60 - 80
- QUANTITATIVE MEASURE OF PRESSURE CIRCULATING BLOOD EXERTS AGAINST VESSEL WALLS
- CAN FALL MARKEDLY IN STATES OF "SHOCK," HEMORRHAGE, HEART ATTACKS OF SYSTOLIC PRESSURE IS LESS THAN 80 mm Hg THEN ADDITIONAL BLOOD VOLUME MUST BE SUPPLIED IV FOR CIRCULATORY SYSTEM TO MAINTAIN ITSSELF.

**REACTION TO PAIN:**
- AT INJURY SITE - PROBABLY NO DAMAGE TO SPINAL CORD
- NO PAIN BUT OBVIOUS SIGN OF INJURY
  - SPINAL CORD DAMAGE
  - HYSTERIA
  - SHOCK
  - EXCESSIVE DRUGS OR ALCOHOL
**INTERPRETATION FOR EMERGENCY CARE**

**PUPILS**
- Normally will contract from direct light in eye.
- Dilated or enlarged pupils indicate an unconscious or relaxed state.
- When blood to brain stops:
  - Pupils start dilating in 30-45 seconds.
  - Pupils will be fully dilated/fixed in 1-1/2 - 2 minutes.
  - Brain cells die after 4-6 minutes.
- Unequal pupil size is seen in brain injuries, spinal cord injuries, strokes.

**STATES OF CONSCIOUSNESS**
- Alert - Responds to vocal or physical stimuli.
- Stupor - Partly alert, will react to painful stimuli, confused state of mind.
- Coma (unconscious) - State from which patient cannot be aroused.

**BODY TEMPERATURE**
- Normal temp. = 98.6°F.
- Skin is largely responsible for body temp. regulation, if skin is
  - Cool, clammy - Nervous system response to trauma or blood loss.
  - Blood vessels restrict blood flow.
  - Dry, hot - May result from fever or illness or exposure to excessive heat.

**PULSE**
- Normal = 60 - 80 beats/minute.
- Can be felt at 3 major sites (carotid, wrist, femoral).
- Rate indicates pumping rate of heart.
- Pulse strength - Qualitative indication of heart stroke strength of pulse pressure (systolic minus diastolic pressure).
- Rapid/weak pulse - Seen in states of shock.
- Rapid/strong pulse - Seen in states of hypertension, fright.
- Below 60/minute - Bradycardia (slow heart rate).
- Above 100/minute - Tachycardia (rapid heart rate).

**PARALYSIS OR LOSS OF SENSATION IN:**
- Lower extremities - Spinal cord injury in lower back.
- Upper extremities - Spinal cord injury in neck.
- Paralysis limited to one side - Stroke or head injury with brain damage.
BASIC EMERGENCY CARE PRIORITIES FOR INDIVIDUAL VICTIM

IF "IMPACT" TYPE OF EMERGENCY SIMULTANEOUSLY WITH OTHER PRIORITIES:
• ASSUME POSSIBILITY OF NECK AND/OR SPINAL FRACTURES.

1. RESPIRATION CARE
   • AIRWAY
   • BREATHING
   - CLEAR AIRWAY
   - VENTILATION
   - SEAL OPEN CHEST WOUNDS
   - STABILIZE FLAIL CHEST

2. CARDIAC CIRCULATION CARE
   - CIRCULATION/VENTILATION (CPR)

3. BLEEDING CONTROL

4. IMMOBILIZE FRACTURES/DISLOCATIONS

5. DRESS AND BANDAGE WOUNDS

6. PREPARE FOR TRANSPORT WHILE MAINTAINING SUPPORTIVE CARE

7. TRANSPORT WHILE MAINTAINING SUPPORTIVE CARE
CRITERIA FOR "TRIAGE"
(SORTING OF VICTIMS ACCORDING TO SEVERITY OF INJURIES)

FIRST PRIORITY EMERGENCIES

RESPIRATION PROBLEMS

- AIRWAY BLOCKAGE
- BREATHING PROBLEMS

CIRCULATION PROBLEMS

- HEART ARREST
- HEART ATTACK
- UNCONTROLLED BLEEDING
- SEVERE SHOCK (HYPOVOLEMIC)

HEART PUMP PROBLEMS
BLOOD SUPPLY
PROBLEMS

OTHER TRAUMA/MEDICAL PROBLEMS

- SEVERE HEAD OR NECK INJURIES
- OPEN CHEST WOUNDS
- OPEN ABDOMINAL WOUNDS
- SEVERE MEDICAL PROBLEMS, SUCH AS POISONINGS, DIABETIC COMPLICATIONS, ETC.

SECOND PRIORITY EMERGENCIES

- BURNS
- MAJOR MULTIPLE FRACTURES
- BACK INJURIES

THIRD PRIORITY

- MINOR FRACTURES
- MINOR INJURIES
- OBVIOUSLY DEAD OR DYING (MORTALLY WOUNDED) VICTIMS

PRECEDEDING PAGE BLANK NOT FILMED
"TRIAGE" LOGIC

1. EXAMINE VICTIM (FIRST OR NEXT)

2. CLASSIFY AS TO EMERGENCY CARE PRIORITY
   IF:
   1 2 3

   YES
   HAVE ALL VICTIMS BEEN EXAMINED?

   NO

3. QUICKLY REASSURE VICTIM
   PROVIDE DRESSINGS AND SOLICIT VICTIM'S Bystander's AID IN CONTROLLING BLEEDING/COVERING WOUNDS

4. INDICATE AID WILL BE PROVIDED AFTER OTHER PRIORITY VICTIMS ARE EXAMINED.
   SOLICIT AID TO COVER DEAD VICTIMS.

5. GO TO NEXT VICTIM.

GIVE IMMEDIATE CARE AS PER EMERG. CARE PRIORITY (PAGE 5-4)

IS VICTIM STABLE & NOW AT A LOWER PRIORITY STATE?

YES

HOLD FOR TRANSPORT.

GO TO NEXT VICTIM.

NO

MORE CARE REQUIRED?

VICTIM CAN BE SAVED BUT MORE CARE REQUIRED?

YES

HOLD FOR TRANSPORT.

CONTINUE TREATMENT AS DIRECTED.
REQUEST ADDITIONAL EMT ASSISTANCE, IF REQUIRED.
MAINTAIN SUPPORTIVE THERAPY UNTIL TRANSPORT.

NO

REQUEST INSTRUCTION FROM BASE STATION.
REPORT DEATH TO DISPATCHER FOR DISPOSITION.

HOLD FOR TRANSPORT
GO TO NEXT VICTIM.

5-5
ASSESS SITUATION

REPORTING PARK AMBULANCE IN DISPATCHING SAFE LOCATION

EMERGENCY TYPE?

TRAUMA/INJURY EMERG.

TRAUMA (IMPACT) TYPE EMERGENCY

BURNS EMERGENCY

ELECTRIC SHOCK EMERGENCY

DROWNING

SEE PAGE 5-7 "IMPACT" EMERGENCY CARE LOGIC;

- CALL FOR RESCUE ASSISTANCE
- ESTABLISH DANGER ZONE
- KEEP BYSTANDERS REMOVED FROM DANGER ZONE
- WHEN EMERGENCY CARE CAN BE GIVEN VICTIM
  - PROVIDE CPR AS PER SECTION 2
  - PROVIDE BURN CARE AS PER SECTION 7

- DO NOT ATTEMPT TO DRAIN WATER FROM LUNGS
- BEGIN MOUTH-TO-MOUTH RESUSCITATION IMMEDIATELY
- IF THERE IS NO PULSE AND SIGNS OF CARDIAC ARREST, ...
- BEGIN CPR
- AS SOON AS POSSIBLE, ADMINISTER OXYGEN UNDER POSITIVE PRESSURE
- EVEN AFTER APPARENT RECOVERY, TRANSPORT VICTIM TO HOSPITAL FOR EXAMINATION. DELAYED ADVERSE REACTIONS ARE COMMON.

GENERAL PROCEDURE EMT'S APPROACH TO

CARDIAC EMERGENCY

POISONINGS AND DRUG OVERDOSE

STROKE

SEE SECTION 3 PAGE 3-19

SEE SECTION 7 PAGE 7-3

SIGNS
- UNEQUAL PUPILS
- USUALLY FLUSHED AND WARM
- RESPIRATION SLOW SNORING TYPE
- WEAKNESS OR PARALYSIS IN ONE SIDE OF BODY

PROCEDURES
- ASSURE OPEN AIRWAY
- KEEP VICTIM LYING DOWN
- GIVE NOTHING BY MOUTH
- DO NOT APPLY HEAT TO BODY
- GIVE O₂ IF CYANOTIC
- IF HEART STOPS CPR
- TRANSPORT AS QUIETLY AS POSSIBLE

DIABETIC COMA (INADEQUATE INSULIN)

SIGNS:
- FLUSHED FACE, RED-DRY SKIN
- "FRUITY" BREATH ODOR
- STUPOR
- DEEP, RAPID, GULPING RESPIRATION

PROCEDURES
- TRANSPORT TO HOSPITAL WITHOUT DELAY
# General Procedural Logic for Approach to the Emergency Scene

## Medical Emergencies

<table>
<thead>
<tr>
<th>Emergency Type</th>
<th>Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poisonings and Drug Overdose</td>
<td>See Section 7, Page 7-3</td>
</tr>
<tr>
<td>Stroke</td>
<td>See Other Emergency Care Texts</td>
</tr>
<tr>
<td>Diabetic States</td>
<td>See Other Emergency Care Texts</td>
</tr>
<tr>
<td>Obstetrics Childbirth Care</td>
<td>See Section 7, Page 7-3</td>
</tr>
<tr>
<td>Acute Abdominal Pains</td>
<td>See Section 7, Page 7-3</td>
</tr>
<tr>
<td>Psychiatric</td>
<td>See Section 7, Page 7-2</td>
</tr>
<tr>
<td>Convolusions</td>
<td>See Section 7, Page 7-2</td>
</tr>
<tr>
<td>Shock</td>
<td>See Section 7, Page 7-2</td>
</tr>
</tbody>
</table>

### Other Convolusions

- **If from fever:**
  - Give nothing by mouth
  - Treat for shock
  - If vomiting, maintain clear airway
  - Transport

### Epileptic Seizure

**Signs:**
- Frothing at mouth is common
- Victim may bite tongue
- Face pale at first becoming cyanotic during seizure
- Muscles tense for 5-30 seconds

**Procedures:**
- Place gag between teeth (3 taped padded tongue depressors)
- Loosen victim's tie, collar, belt
- Do not restrain or give fluids
- Protect from nearby objects
- Shield from on-lookers
- After seizure, transport to hospital if required

**Insulin Shock (Too Much Insulin)**

**Signs:**
- Cold, clammy skin
- Trembling and hunger pangs
- Possible coma or epileptic-like seizure
- Rapid weak pulse

**Procedures:**
- IV and 50% dextrose (push) (as directed)
- Transport to hospital
ASSIST SITUATION AND ESTABLISH:
TRAFFIC AND BYSTANDER CONTROL
HAZARD CONTROL
EXTRICATION

POLICE ASSISTANCE
RESCUE SQUAD ASSISTANCE

REPORTING & DISPATCHING

CALL FOR AID AS REQUIRED

IS EXTRICATION REQUIRED?

REQUIRED
NOT REQUIRED

DELAYED ACCESS
IMMEDIATE ACCESS

GAIN ACCESS

CONFINED ACCIDENT SITE (AUTOMOBILE, BUILDING, ETC.)

MULTI OR SINGLE VICTIM?

EXAMINE AND TREAT AS PER "TRIAGE" CRITERIA AND LOGIC (PAGE 5-5) PRIORITIES.
1 2 3

TREAT IMMEDIATELY AS PER CARE PRIORITIES (PAGE 5-3).

REASSURE
SOLICIT AID TO CONTROL BREATHING
DEFER CARE UNTIL PRIORITY VICTIMS CARED FOR

DISENTANGLE VICTIM FROM DEBRIS (BE CAREFUL OF FRACUTURED NECK/BACK).

PREPARE VICTIM FOR REMOVAL
SPINTING
BANDAGING
IMMOBILIZE TO SPINE BOARD IF REQUIRED

EXAMINE AND TREAT AS PER "SINGLE" VICTIM EMT PROCEDURES (PAGE 5-8)

REPLACE AS PER ESTABLISHED EXTRICATION PROCEDURES.
When access to accident site is possible, begin triage of confined victims.

- Examine and treat as per "Single Victim EMT Procedural" (Page 5-8).
- Examine and classify victims into priorities as per "Triage" Criteria and Logic (Page 5-5).
- Tread immediately as per emergency care priorities (Page 5-3) until stable.
- Reassure, solicit aid to control bleeding, defer care until higher priority victims are cared for.
- Make decisions relative to:
  - Continued care
  - Immediate transport to hospital

- Transport to hospital maintaining supportive therapy until transferred to hospital staff.
- If required, "Triage" victims transporting highest priority victims first.
FY CARE PROCEDURAL LOGIC

CONSCIOUS

- REASSURE
- INQUIRE FOR PAINFUL AREAS
- TREAT AS REQUIRED
  - ASSURE ADEQUATE BREATHING
  - CONTROL SEVERE BLEEDING

CHECK
- RESPIRATION
- PULSE
- BLOOD PRESSURE

IF PULSE WEAK:
- CHECK AND TREAT FOR SHOCK
- HAVE VICTIM LIE DOWN
- ELEVATE LEGS
- KEEP WARM
- GIVE IV (IF DIRECTED)

COMPLETE SECONDARY SURVEY AND EMT ACTIONS

CHECK:
- SCAP FOR LACERATIONS
- SKULL FOR DEPRESSIONS
- EAR AND NOSE FOR FLUID/BLOOD
- NECK FOR FRACTURES
- EXTREMITIES FOR PARALYSIS
- CHEST FOR CORRECT MOVEMENT
- CHEST FOR FRACTURES
- ABDOMEN FOR INJURY
  - RIGIDITY, SPASMS, TENDERNESS
- PELVIC FOR FRACTURES
- EXTREMITIES FOR WOUNDS AND FRACTURES
- FOR PARALYSIS OF EXTREMITIES AND SPINAL CORD INJURY
- BUTTOCKS FOR WOUNDS

ACTIONS
- CONTROL BLEEDING WITH GENTLE PRESSURE
- BANDAGE
- DO NOT BANDAGE
- ASPIRATE, CLEAR AIRWAY
- CERVICAL COLLAR TO PREVENT NECK NODDING
- BANDAGE TO SPLINT BOARD TO PREVENT NECK TURNING
- BANDAGE AND IMMOBILIZE/SPLINT AS REQUIRED
- DO NOT GIVE FLUIDS BY MOUTH
- PREPARE FOR TRANSPORT
- IMMOBILIZE ON SCOOP STRETCHER OR LONG BOARD
- DRESS BANDAGE AND SPLINT AS REQUIRED
- IMMOBILIZE ON SCOOP STRETCHER OR LONG BOARD
- DRESS AND BANDAGE AS REQUIRED

TRANSPORT
- MAINTAINING LIFE SUPPORT
**MUSCULO-SKELETAL SYSTEM**

**FUNCTIONS:**
- Body shape and support
- Protection of vital organs (ribs and skull)
- Locomotion (legs)
- Manipulation (arms)

**NECK:**
- Flexion
- Dorsal ventral
- Forehead (frontal)
- Flexion
- Cheek (zygomatic)
- Jaw (mandible)
- Elbow extension

**FOREARM:**
- Radius
- Ulna
- Wrist
- Hand (metacarpals)
- Fingers (phalanges)

**HAND:**
- Metacarpals
- Phalanges

**FOOT:**
- Metatarsals
- Phalanges

**SYSTEM ELEMENTS:**
- Bands of tough flexible connective tissue which join articular surfaces
- Hard tissues that form structural basis for the body
- Organs composed of separate fibers than can contract and shorten muscles are of three types: voluntary, involuntary (stomach and cardiac)
- Cords of strong fibrous tissue which attach muscles to bones
- Where bones fit together to form an articulated surface that allow adjacent bones to move without scraping each other (types: ball and sockets, hinge, fixed)
- Compressible connective tissue that serves to cushion jolts and bumps. Cartilages are at all articular bone surfaces and attach ribs to sternum.
MUSCULOSKELETAL INJURIES
(FRACTURES, DISLOCATIONS, SPRAINS)

CAUSES:
- DIRECT VIOLENCE - BONE BROKEN AT POINT OF CONTACT WITH OBJECT
- INDIRECT VIOLENCE - BONE BROKEN BY FORCES TRANSMITTED ALONG THE LINE OF THE BONE FROM THE
  POINT OF IMPACT
- SEVERE TWISTING - BODY TWISTING WHEN EXTREMITY IS CAUGHT OR HELD IN PLACE
- OTHER CAUSES - POWERFUL MUSCULAR CONTRACTIONS CAN CAUSE BONES TO BREAK
  - DISEASE AND AGING CAN WEAKEN BONES SO THAT ONLY SMALL FORCES ARE NEEDED TO
    CAUSE FRACTURE
- FRACTURES - BREAKS IN THE BONE (HARD TISSUE)
  - TYPES OF FRACTURES:
    - "OPEN" FRACTURE - ASSOCIATED WITH AN OPEN
      WOUND IN SKIN MADE BY TEARING OF BONE
    - "CLOSED" FRACTURE - WITH NO BREAKING OF SKIN
  - SIGNS OF FRACTURES:
    - EXPOSED BONE ENDS
    - DEFORMITY
    - PATIENT INFORMATION (E.G., "HEARD BONE CRACK!")
    - PAIN OR TENDERNESS
    - GRATING WHEN BONE ENDS RUB TOGETHER
    - SWELLING AND DISCOLORATIONS
    - LOSS OF USE OF AFFECTED EXTREMITY
- DISLOCATIONS - DISPLACEMENT OF A BONE END THAT FORMS PART OF A JOINT.
  - JOINTS MOST AFFECTED:
    - SHOULDER
    - FINGERS
    - ANKLES
    - ELBOWS
    - HIPS
    - KNEES
  - SIGNS OF DISLOCATIONS:
    - PAIN IN JOINT
    - DEFORMITY AT JOINT
    - LOSS OF MOVEMENT OF JOINT
    - ADDITIONAL PAIN WHEN MOVEMENT ATTEMPTED
- SPRAINS - INJURIES IN WHICH LIGAMENTS ARE TORN BY MOTION FORCED BEYOND RANGE OF JOINT
  - AREAS MOST AFFECTED:
    - ANKLES
    - KNEES
  - SIGNS OF SPRAINS (MAY LOOK LIKE FRACTURE OR DISLOCATION BUT WILL NOT BE DEFORMED)
    - PAIN ON MOVEMENT
    - SWELLING
    - DISCOLORATION

GENERAL PRINCIPLES OF EMERGENCY CARE OF INJURIES TO BONES OR JOINTS
- FRACTURES, DISLOCATIONS AND SPRAINS MAY APPEAR GRUESOME BUT USUALLY ARE NOT LIFE THREATENING.
- GOOD CARE BY EMT CAN MAKE RECOVERY A LESS LENGTHY AND PAINFUL PROCESS.
- TREAT ALL INJURIES TO BONES AND JOINTS AS IF THEY ARE FRACTURES.

GENERAL TREATMENT PROCEDURES

1. STABILIZE AND MONITOR WELL BEING OF VICTIM AS A WHOLE:
   - ASSURE OPEN AIRWAY
   - STOP BLEEDING AND DRESS WOUNDS
   - PREVENT SHOCK

2. WHEN STABLE, CARE FOR SPECIFIC INJURY:
   2. STRAIGHTEN ANGULATED FRACTURES THAT CAN BE SAFELY STRAIGHTENED.
      - LOWER LEG
      - UPPER LEG
      - LOWER ARM
      - UPPER ARM

CAUTION
- DO NOT ATTEMPT TO STRAIGHTEN FRACTURES OF SHOULDER, ELBOWS, WRISTS, OR KNEES
- DO NOT ATTEMPT TO PUSH BACK ANY BONES ENDS
- DO NOT ATTEMPT TO REDUCE DISLOCATIONS

3. IMMobilize (BY SPLINTING OR BANDAGING TO PREVENT MOVEMENT) THE EXTREMITY OR JOINT BEFORE
   MOVING THE VICTIM.
   - IMMobilize JOINTS ABOVE AND BELOW FRACTURE
   - IMMobilize DISLOCATED JOINTS IN PLACE - DO NOT STRAIGHTEN
SPLINTING

ACCIDENTS RESULTING IN FRACTURES TO THE BONES REQUIRE EMERGENCY CARE TO IMMOBILIZE THE AFFECTED BODY PART(S) AND PRECLUDE FURTHER INJURY TO THE BONES AND SURROUNDED TISSUE AND NERVES. THIS IS ACCOMPLISHED THROUGH USE OF:

- ANY MATERIAL OR EQUIPMENT THAT CAN PROVIDE RIGID SUPPORT FOR INJURED BONES OR JOINTS.

- FUNCTION OF SPLINTS
  - REDUCES CHANCES OF "CLOSED" FRACTURE BECOMING "OPEN"
  - MINIMIZES THE DAMAGE TO NERVES, MUSCLES, OR BLOOD VESSELS
  - PREVENTS BONE ENDS FROM CAUSING LACERATED TISSUES TO BLEED MORE
  - LESSENS PAIN ASSOCIATED WITH BONE MOVEMENTS

- TYPES OF SPLINTS
  - TRACTION SPLINTS
    - THOMAS HALF-RING
      (FOR "CLOSED" FEMUR, UPPER LEG FRACTURES AND LOWER FRACTURES)
  - BOARD SPLINTS
  - SCOPE STRETCHER
    (FOR BACK AND NECK STABILIZATION)
  - PADDED BOARD SPLINTS
    - LONG LEG (54") FOR UPPER/LOWER LEG
    - LONG ARM (30") FOR LOWER LEG/FULL ARM
    - SHORT ARM (15") FOREARM/LOWER LEG
  - TONGUE DEPRESSOR SPLINTS
    (FOR FINGER SPLINTING)
  - AIR SPLINTS
    FOR EXTREMITY SPLINTING
<table>
<thead>
<tr>
<th>NECK FRACTURE SPLINTING</th>
<th>BACK FRACTURE SPLINTING</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>EMT 1</strong></td>
<td><strong>EMT 1</strong></td>
</tr>
<tr>
<td>• APPLY GENTLE TRACTION</td>
<td>• KEEP VICTIM LYING DOWN</td>
</tr>
<tr>
<td>KEEP HEAD STRAIGHT</td>
<td></td>
</tr>
<tr>
<td><strong>EMT 2</strong></td>
<td><strong>SLIDE SCOOP STRETCHER UNDER VICTIM FROM EITHER SIDE</strong></td>
</tr>
<tr>
<td>• APPLIES CERVICAL COLLAR TO PREVENT HEAD FROM NODDING</td>
<td>• CAREFULLY LIFT VICTIM BY HIS CLOTHING JUST ENOUGH TO PREVENT PINCHING VICTIM OR HIS CLOTHING</td>
</tr>
<tr>
<td>• SLIP SPINE BOARD BEHIND OR UNDERNEATH VICTIM (STILL MAINTAIN TRACTION)</td>
<td>• STRAP VICTIM SECURELY TO STRETCHER</td>
</tr>
<tr>
<td>• PLACE PAD BETWEEN NECK AND BOARD</td>
<td></td>
</tr>
<tr>
<td>• STABILIZE HEAD FROM TURNING WITH CRAVATS UNDER CHIN AND FOREHEAD AND TIED IN BACK OF SPINE BOARD</td>
<td></td>
</tr>
<tr>
<td>• STRAP TORSO TO SPINE BOARD WITH STRAPS OVER SHOULDER AND AROUND LEGS (THIS KEEPS LEGS FLEXED)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>RIB FRACTURE SPLINTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>• PLACE ARM OF INJURED SIDE ACROSS CHEST</td>
</tr>
<tr>
<td>• BIND ARM TO CHEST WITH 3 CRAVATS</td>
</tr>
<tr>
<td>• TIE FOURTH CRAVAT AS SLING ALONG LENGTH OF FOREARM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FLAIL CHEST SPLINTING</th>
</tr>
</thead>
<tbody>
<tr>
<td>FLAIL CHEST - MANY BROKEN RIBS AROUND A SEGMENT OF THE CHEST, WHICH CAUSES IT NOT TO MOVE IN AND OUT WITH REST OF CHEST DURING RESPIRATION.</td>
</tr>
<tr>
<td>• PROVIDE RESPIRATION SUPPORT (OXYGEN, BAG-MASK)</td>
</tr>
<tr>
<td>• STABILIZE FLAIL CHEST WITH:</td>
</tr>
<tr>
<td>- SAND BAG OR LARGE PAD MADE WITH MULTI-TRAUMA DRESSINGS,</td>
</tr>
<tr>
<td>- TAPE WITH LARGE STRIPS EXTENDING AND STUCK TO BOTH SIDES OF CHEST.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>AIR SPLINTING OF EXTREMITIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTION: DO NOT OVERINFLATE AND IMPAIR CIRCULATION.</td>
</tr>
<tr>
<td><strong>EMT 1</strong></td>
</tr>
<tr>
<td>• GATHER SPLINT ON ARM</td>
</tr>
<tr>
<td>• GRASP VICTIM'S HAND</td>
</tr>
<tr>
<td>• GRASP LIMB ABOVE FRACTURE</td>
</tr>
<tr>
<td>BOTH</td>
</tr>
<tr>
<td><strong>EMT 2</strong></td>
</tr>
<tr>
<td>• TRANSPORT VICTIM LYING ON &quot;TAPE&quot; SIDE TO SUPPORT BANDAGE AND ALLOW OTHER SIDE TO BREATH EASIER.</td>
</tr>
</tbody>
</table>

| FOLDOUT FRAG 3 |

6-3
EMT RT:

**FRAC TURES OF FOREARM**
- If angulated, straighten carefully with manual traction
- Secure forearm to "15" padded board splint
- Place splinted arm in sling

**FRAC TURES OF CLAVICLE**
- Knot long side of bandage to hold on shoulder
- Position arm high across chest
- Sling with cravat above elbow and under wrist
- Secure arm with knotted triangle swathe to support during transport

**FRAC TURES OF CLAVICLE**
- If angulated, straighten carefully with manual traction
- Apply cravat ankle-hitch and tie snug but not tight
- EMT #2 applies and maintains just enough manual traction to relieve pain until splinting is complete
- (One hand under heel) (one hand over instep)

**FRAC TURES OF ELBOW**
- Do not attempt to straighten
- Splint in position found
- Pad palm of hand with gauze roll
- Firmly wrap gauze around forearm
- Wrap gauze around hand leaving only fingers exposed

**FRACTURED WRIST OR HAND**
- Place splinted arm in sling

**HUMERUS (UPPER ARM): FRACTURES AND DISLOCATED SHOULDER**
- Knot in long side to hold on shoulder
- Sling forearm with cravat
- Tie cravat swathes around affected arm and chest
- Cradle in knotted triangular swathe

**FRAC TURES OF WRIST**
- Do not attempt to straighten
- Secure forearm to 15" padded board splint
- Place split arm in sling

**ELBOW FRACTURES**
- Do not straighten
- Immobilize elbow in position found

**HUMERUS (UPPER ARM): FRACTURES AND DISLOCATED SHOULDER**
- Position arm high across chest
- Sling with cravat above elbow and under wrist
- Secure arm with knotted triangle swathe to support during transport

**ELBOW FRACTURES**
- Do not attempt to straighten
- Immobilize elbow in position found

**HUMERUS (UPPER ARM): FRACTURES AND DISLOCATED SHOULDER**
- Position arm high across chest
- Sling with cravat above elbow and under wrist
- Secure arm with knotted triangle swathe to support during transport

**HUMERUS (UPPER ARM): FRACTURES AND DISLOCATED SHOULDER**
- Slide scoop stretcher under victim from either side
- Carefully lift victim by his clothing to prevent pinching victim or his clothing
- Strap victim securely to stretcher

- Requires access to both sides of patient
LOWER EXTREMITY FRACTURE SPLINTING

"CLOSED" FEMUR (THIGH) FRACTURES

- Do not remove shoe
- Place pad around ankle
- Apply cravat ankle-hitch and tie snug but not tight
- EMT #1 applies and maintains just enough manual traction to relieve pain until splinting is complete
- One hand under heel (one hand over instep)

EMT #2:
- Installs half-ring splint
  - Longside to outside of leg
  - Half ring against buttocks
- Apply lock hitch around half-ring and under ankle
- Pull downward to equal traction of EMT #1
- Secure lock hitch ends around half-ring and tie back to lock hitch
- Tape three tongue depressors together, insert thru middle of lock hitch and twist to apply just enough traction to relieve pain
- Tie cravats around leg for support
- 2 cravats above knee
- 2 cravats below knee
- Prop splint up on block or blanket so heel doesn't touch ground or cot

"OPEN" FEMUR (THIGH) FRACTURE SPLINTING

- Do not straighten fracture
- 54° board outside of fractured leg
- 30° board inside of fractured leg
- Pad ends over boards
- Secure longboard with two cravats across chest

FRACTURE
- Cravat above fracture
- Cravat below fracture and above knee
- Cravat below knee
- Cravat above ankle

NECK FRACTURE SPLINTING

- Do not straighten
- Immobilize in position found
- Use pillow splint or two 30° padded boards tied with cravats as below

LOWER LEG FRACTURE SPLINTING

- 2 30° padded boards
- Secure with 4 cravats

FRACTURE SITE
- Above knee
- Above fracture
- Below fracture
- Above ankle

ANKLE/FOOT OR KNEE FRACTURE SPLINTING

- Do not straighten
- Loosen or cut laces of shoe if on foot
- Do not remove shoe
- Mold pillow around foot or knee
- Secure with cravat bandages

HIP FRACTURE SPLINTING

- Slide scoop stretcher under victim from either side
- Carefully lift victim by his clothing to prevent pinching victim or his clothing
- Strap victim securely to stretcher
- Requires access to both sides of patient

- Slide backboard under victim (carefully)
- Place folded blanket between legs
- Bandage legs together and tie to longboard
- Further secure to longboard with straps
WOUNDS - DRESSINGS/BANDAGES

ASSOCIATED WITH ACCIDENTS WILL USUALLY BE:

**WOUNDS** - INJURIES TO SOFT TISSUES OF THE BODY

**CLOSED:**
BRUISES OR CONTUSIONS WHERE SKIN NOT BROKEN BUT TISSUE IS CRUSHED BELOW SITE CAUSED BY BLUNT OBJECT IMPACT

**OPEN:**
WHERE SKIN IS BROKEN:
1) ABRASIONS - SCRAPES
2) INCISIONS - CLEAN CUTS
3) LACERATIONS - JAGGED, IRREGULAR CUTS
4) PUNCTURES - HOLES CAUSED BY NAILS, STABS, GUNSHOT
5) AVULSIONS - SKIN TEARS (LOOSE OR HANGING)

EMERGENCY CARE REQUIRES BANDAGING TO:
- PREVENT CONTAMINATION
- PROVIDE SUPPORT AND PADDING TO INJURY
- CONTROL BLEEDING
- EASE PAIN

TYPES OF EMERGENCY CARE WOUND COVERING
1) **DRESSING** - STERILE COVERING FOR WOUNDS
2) **BANDAGE** - MATERIAL USED TO:
   - SECURE DRESSINGS
   - PUT PRESSURE ON WOUND FOR BLEEDING CONTROL
   - SECURE AND PAD SPLINTS
   - SUPPORT (SLING OR SWATH) INJURED PART
3) **COMPRESS BANDAGE** - COMBINATION DRESSING/BANDAGE IN ONE BANDAGE UNIT

BASIC DRESSING/BANDAGING PROCEDURES
- APPLY DRESSING (KEEP STERILE)
  (USE PRESSURE IF NECESSARY TO STOP BLEEDING)
- ANCHOR BANDAGE BY WRAPPING
- WRAP BANDAGE OVER DRESSING
- FASTEN BANDAGE
  TYING, TAPE OR SAFETY PINS

CAUTIONS
- DRESS AND BANDAGE ALL WOUNDS
- APPLY BANDAGES FIRMLY AND EVENLY, BUT NOT TOO TIGHT TO IMPED CIRCULATION.
- DO NOT USE ELASTIC BANDAGES
- KEEP DRESSINGS CLEAN AND UNCONTAMINATED BEFORE APPLICATION
- LEAVE FINGERS AND TOES EXPOSED SO CIRCULATION CAN BE CHECKED BY OBSERVING SKIN AND NAIL COLOR
BLOOD LOSS AND CONTROL OF BLEEDING

- Blood will clot in approximately 6-7 minutes.
- Average adult has approximately six quarts of blood.
- Loss of 15% (1 quart) of blood (externally and/or internally) is very serious and results in a moderate state of cardiovascular "shock."
- Loss of 30% (2 quarts) or more results in a severe state of shock. Body is in severe danger.
- Abnormal loss of blood causes:
  - System to suffer from oxygen loss
  - Blood pressure to decrease
  - Heart rate increases
  - Force of heartbeat is reduced, pulse weak

EXTERNAL BLEEDING:
- Spurts from arteries (bright red color)
- Flows slowly and steadily from veins (dark red color)
- Oozes from capillaries

METHODS OF CONTROLLING BLEEDING

IF BLEEDING IS RELATIVELY MILD?
- Apply direct pressure over the wound with sterile dressing.*
- Maintain pressure (10-30 minutes) by binding the dressing with bandages (adhesive tape and gauze bandage)
- If bandage gets blood soaked, cover with new bandage, do not remove old bandage. (Repeat as required)
- Treatment for "shock" should be instituted as is appropriate.

IF BLEEDING IS SEVERE?
- Quickly, place hand over wound* and exert pressure. (Do not wait)
- If bleeding persists, insert fingers into wound and attempt to compress artery between fingers and bone.
- After bleeding is controlled, place pressure dressings over wounds as in other procedure.
- If bleeding persists, use finger pressure at pressure points** between wound and heart.
- Treatment for "shock" should be instituted as is appropriate.

CAUTION

* Do not apply too much pressure to scalp if bone damage is suspected

NOTES:
- The scalp contains many arteries and blood vessels. Injuries here will usually bleed heavily.
- Soft tissue wounds of neck may also bleed heavily.
- If a large vein of the neck has been lacerated, apply pressure both above and below wound on the affected side to prevent air from entering circulatory system.
**TRIANGLE BANDAGING**

**FOR SHOULDER**

- Anchor around head
- Cover dressings and ear (this leaves throat and airway open)

**FOR HEAD**

- Folded behind ear
- Drape with gauze. Do not bind.

**FOR ELBOWS**

- Burned
  - Wet wound with sterile saline
  - 4x4 gauze pads between fingers and thumb
- Burned
  - Dressing over wound
  - Bind, leaving fingers exposed
- Figure "8" for knees

**FOR ARMS**

- Long edge next to body
  - Pin or tape corner for cradle

**FOR HANDS/FEET**

- Long edge next to body
  - Pin or tape corner for cradle

**FOR ANKLE/HEEL**

- Net wound with sterile dressing over saline
  - 4x4 gauze pads between wrist, leaving fingers and thumb exposed
  - 3" roll of gauze in palm
  - Drape with gauze. Do not bind.
<table>
<thead>
<tr>
<th><strong>FOR ARMS</strong></th>
<th><strong>FOR ARMS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>CRAVAT BANDAGING</td>
<td>SPECIAL BANDAGING</td>
</tr>
<tr>
<td><strong>FIGURE &quot;8&quot; FOR ELBOW</strong></td>
<td><strong>FINGER PRESSURE</strong></td>
</tr>
<tr>
<td><strong>FOR FOREHEAD</strong></td>
<td><strong>BUILD BULKY BANDAGE OVER FINGERS</strong></td>
</tr>
<tr>
<td><strong>FOR FOREARM</strong></td>
<td><strong>FASTEN DRESSINGS WITH WIDE TAPE</strong></td>
</tr>
<tr>
<td><strong>FOR ARMPITS</strong></td>
<td><strong>ABDOMINAL INJURIES</strong></td>
</tr>
<tr>
<td><strong>FOR ARM SLING</strong></td>
<td><strong>PLACE PATIENT ON BACK WITH LEGS FIXED</strong></td>
</tr>
<tr>
<td><strong>FOR ARM SLING</strong></td>
<td><strong>IF ORGAN PROTRUDING THROUGH WOUND</strong></td>
</tr>
<tr>
<td><strong>FOR KNEE BANDAGING</strong></td>
<td><strong>- DO NOT REPLACE ORGANS WITHIN CAVITY</strong></td>
</tr>
<tr>
<td></td>
<td><strong>- COVER ORGANS WITH</strong></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PUNCTURE OF CHEST CAVITY**
- Cover wound with folded aluminum foil
- Seal edge of dressing with overlapping wide tape
- Transport victim lying on injured side

**IMPALED OBJECT (DO NOT REMOVE)**
- Control bleeding with finger pressure
- Build bulky bandage over fingers
- Fasten dressings with wide tape

**ABDOMINAL INJURIES**
- Place patient on back with legs fixed
- If organ protruding through wound
  - Do not replace organs within cavity
  - Cover organs with
    - Aluminum foil
    - Multi-trauma dressing
      Held in place with tape
SKIN BURNS

Severe burns may result in "shock" due to fluid loss, pain and other factors.

Major types of burns of concern:

Heat Burns - seriousness depends on degree or depth of burn and the amount of body surface affected.

Chemical Burns - strong chemicals like acids and alkali's burn rapidly (alkali's burn deeper and longer). Must be washed off quickly to prevent injury.

Electrical Burns - electricity continues to burn as it penetrates skin.

- Look for two burns where electricity enters and leaves the body.
- Often accompanied by respiratory and cardiac arrest.

Burns should be examined and reported as to degree (depth) and extent of area burned.

Degree (depth criteria):

- First degree (epidermis only - skin redness and inflammation)
- Second degree (damage into upper dermis - blisters)
- Third degree (damage to all layers which usually appears dry, pale, or white, may be brown or charred - may be loss of pain sensation in injured area)

Critical Burns include:

- Burns complicated by respiratory tract injury and fractures
- 3rd degree burns involving critical areas of face, hands, feet
- 3rd degree burns over more than 10% of body
- 2nd degree burns over 30% of body.

Moderate Burns

- 3rd degree burns over 2-10% of body area and no critical areas
- 2nd degree burns over 15-30% of body surface
- 1st degree burns over 50-75% of body

Minor Burns

- 3rd degree burns of less than 2% of body
- 2nd degree burns of less than 15% of body
- 1st degree burns of less than 20% of body and no critical areas.
EMERGENCY CARE FOR BURNS

CHEMICAL BURNS

- REMOVE ALL CONTAMINATED CLOTHING, ESPECIALLY SHOES AND SOCKS
- FLOOD THE AFFECTED AREA WITH WATER LONG ENOUGH TO FLUSH CHEMICAL FROM SKIN

CAUTIONS

DRY LIME - WATER MAKES DRY LIME A CORROSIVE SUBSTANCE,
- BRUSH IT OFF CAREFULLY FIRST PRIOR TO A THOROUGH FLOODING OF THE AREA WITH WATER.

CARBOLIC ACID (PHENOL) BURNS - WASH OFF WITH ALCOHOL SINCE CARBOLIC ACID IS NOT SOLUBLE IN WATER.

- COVER AREA WITH STERILE DRESSINGS OR BURN SHEETS.
- TREAT FOR SHOCK AS REQUIRED.

THERMAL BURNS

- CHECK FOR SMOKE OR FUME INHALATION
  (INHALING HOT SMOKE AND FUMES MAY CAUSE THROAT TISSUES TO SWELL-UP CAUSING CONSTRUCTION)
- PROVIDE RESPIRATION SUPPORT, AS REQUIRED.
- TREAT ACCOMPANYING LACERATIONS OR FRACTURES AS IF NO BURNS PRESENT
- COVER BURNED AREAS WITH STERILE BURN SHEET
- TREAT PATIENT FOR SHOCK AND MAINTAIN BODY HEAT.
- QUICKLY TRANSPORT TO HOSPITAL.
BRAIN AND SKULL INJURIES

CLASSIFICATION:
- Open
  - Combination of scalp lacerations, fragmented skull material (from skull fractures), and lacerations of membranes covering the brain.
- Closed
  - Scalp laceration may or may not be present
  - Skull intact and no abnormal opening to the brain
  - Brain damage transmitted by trauma to the depths of the brain

SIGNS OF SKULL FRACTURE:
- Deformity of the skull may be evident
- Blood or clear, watery fluid in the ears or nose
- Discoloration of soft tissue under eyes
- Unequal pupils

EMT PROCEDURES WHEN SKULL AND/OR BRAIN INJURY SUSPECTED:
- Evaluate state of consciousness by checking victim's
  - Awareness of surroundings and situation
  - Reaction to pain
  - Reaction of pupils to light
- Verify if pupil sizes are same or unequal.
- Treat as if victim has neck as well as head injury.
- Maintain open airway.
- Check for and stabilize neck injuries.
- Do not attempt to control drainage from ears, mouth or nose.
- Cover open wounds to head with minimum of pressure.
- Do not remove impaled objects.
- Transport victim to hospital without delay—carefully.
- Administer 100% oxygen during transportation.

NOTE
PLACE VICTIM ON HIS SIDE IF POSSIBLE.
# General Procedural Logic for EMT's Approach to the Emergency Scene

## Medical Emergencies

<table>
<thead>
<tr>
<th>Cardiac Emergency</th>
<th>Poisonings and Drug Overdose</th>
<th>Stroke</th>
<th>Diabetic States</th>
<th>Obstetrics Childbirth Care</th>
<th>Acute Abdominal Pains</th>
<th>Psychiatric</th>
<th>Convulsions</th>
<th>Shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>See Section 3, Page 3-19</td>
<td>See Section 7, Page 7-3</td>
<td></td>
<td>See Other Emergency Care Texts</td>
<td></td>
<td>See Section 7, Page 7-5</td>
<td></td>
<td>See Section 7, Page 7-2</td>
<td></td>
</tr>
</tbody>
</table>

### Signs
- Unequal pupils
- Usually flushed and warm
- Respiration slow, snoring type
- Weakness or paralysis in one side of body
- As sure open airway
- Keep victim lying down
- Give nothing by mouth
- Do not apply heat to body
- Give 0-5% if cyanotic
- If heart stops, CPR
- Transport as quietly as possible

### Procedures
- Place gag between teeth (3 taped padded tongue depressors)
- Loosen victim's tie, collar, belt
- Do not restrain or give fluids
- Protect from nearby objects
- Shield from on-lookers
- After seizure, transport to hospital if required

## Other Convulsions

### Signs
- Rub with alcohol to cool
- Frothing at mouth is common
- Victim may bite tongue
- Face pale at first becoming cyanotic during seizure
- Muscles tense for 5-30 seconds

### Procedures
- Place gag between teeth
- Loosen victim's tie, collar, belt
- Do not restrain or give fluids
- Protect from nearby objects
- Shield from on-lookers
- After seizure, transport to hospital if required

## Diabetic Coma (Inadequate Insulin)

### Signs
- Flushed face, red-dry skin
- "Fruity" breath odor
- Stupor
- Deep, rapid, gulping respiration

### Procedures
- Transport to hospital without delay

## Insulin Shock (Too Much Insulin)

### Signs
- Cold, clammy skin
- Trembling and hunger pangs
- Possible coma or epileptic like seizure
- Rapid weak pulse

### Procedures
- IV and 50% dextrose (push) (as directed)
- Transport to hospital
"SHOCK" IS A DEPRESSED CONDITION OF VITAL BODY FUNCTIONS DUE TO FAILURE OF ENOUGH OXYGENATED BLOOD TO CIRCULATE THROUGHOUT THE BODY.

THREE BASIC CAUSES OF SHOCK:

- **HEART CAN BE DAMAGED SO THAT IT FAILS TO PUMP PROPERLY SUCH AS IN:**
  - HEART ATTACK (CLOTS, INFARCTION) INFLAMMATION
  - VALVE DAMAGE (TRAUMA TO CHEST)
  - SEVERE DISTURBANCE OF ELECTRICAL FUNCTIONS OF HEART (ARRHYTHMIAS)
  - CONGESTIVE HEART FAILURE

- **BLOOD CAN BE LOST SO THAT THERE IS INSUFFICIENT VOLUME IN CIRCULATING SYSTEM**

  A SYSTOLIC BLOOD PRESSURE OF LESS THAN 80 mm Hg REFLECTS INEFFICIENT PUMPING BY THE HEART OR A SERIOUS LOW BLOOD VOLUME CONDITION (HYPOVOLEMIA). THIS CONDITION CAN RESULT FROM:
  - BLEEDING (EXTERNAL OR INTERNAL) USUALLY FROM TRAUMA
  - BURNS (WHERE BLOOD PLASMA LEAVES THE BLOOD AND REDUCES THE VOLUME)
  - DEHYDRATION (VIA KIDNEYS, DIGESTIVE TRACT, HEAT EXHAUSTION)

- **BLOOD VESSELS CAN DILATE SO THAT BLOOD FLUIDS POOL IN THE EXTREMITIES SERIOUSLY REDUCING THE BASIC CIRCULATORY BLOOD VOLUME. THIS CAN RESULT FROM:**
  - ALLERGIC DRUG REACTIONS (ANAPHYLACTIC SHOCK)
  - DEPRESSION OF NERVOUS SYSTEM FUNCTIONS FROM:
    - PAIN
    - DRUGS
    - HEAT STROKE
    - SERIOUS INFECTION

VICTIM SIGNS IN SHOCK

<table>
<thead>
<tr>
<th>SKIN</th>
<th>RESPIRATION</th>
<th>BLOOD PRESSURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>PALE TO BLUE</td>
<td>SHALLOW</td>
<td>FALLS GRADUALLY</td>
</tr>
<tr>
<td>COLD, CLAMMY</td>
<td>IRREGULAR</td>
<td>OR SOMETIMES RAPIDLY</td>
</tr>
<tr>
<td>PROFUSE SWEATING</td>
<td>LABORED</td>
<td></td>
</tr>
</tbody>
</table>

EYES - DULL, LACK LUSTER
PUPILS - DILATED
MENTAL STATE - CONFUSED, STUPOROUS, ANXIOUS

MAY BE:
- THIRSTY
- NAUSEATED
- VOMITING

PULSE
- RAPID
- WEAK
- THREADY

TREATMENT FOR SHOCK

- CLEAR AND MAINTAIN AIRWAY--AS PER CPR (VENTILATION AND CIRCULATION) PROCEDURES.
- CONTROL BLEEDING.
- PREVENT BODY HEAT LOSS (BLANKET UNDER AND OVER PATIENT)
- KEEP VICTIM LYING DOWN, FEET ELEVATED UNLESS RESPIRATION DIFFICULTIES REQUIRE TRANSPORTATION IN SEMI-SITTING POSITION.

**CAUTION**
DO NOT GIVE FLUIDS BY MOUTH EVEN IF VICTIM COMPLAINS OF THIRST

- CHECK BLOOD PRESSURE REGULARLY
- GIVE IV FLUIDS, AS DIRECTED, TO INCREASE BLOOD VOLUME
- CONTINUE TO MONITOR AND REPORT VITAL SIGNS TO BASE STATION.
POISON AND DRUG ABUSE

BACKGROUND
POISONS ARE SUBSTANCES WHEN TAKEN INTO THE BODY CAN AFFECT THE FUNCTION AND STRUCTURE OF THE BODY SUCH THAT HEALTH OR LIFE IS THREATENED.

ABUSE OF DRUGS BY INDIVIDUALS TRYING TO ESCAPE SADNESS, GRIEF, LONELINESS, DISCOMFORT CAN LEAD TO EXCESSES THAT CAN ALSO THREATEN HEALTH AND LIFE.

POISONS OR DRUGS MAY ENTER BODY:
- BY NATURAL OR UNINTENTIONALLY
- BY BITE FROM ANIMALS, INSECTS, RABID ANIMALS OR HYPODERMIC INJECTIONS
- INTENTIONALLY
- INTO THE SKIN FROM INJECTIONS OR NEEDLES

GENERAL CLASSES OF POISONS, DRUGS AND PROBABLE SYMPTOMS

<table>
<thead>
<tr>
<th>POISONOUS</th>
<th>DEPRESSANTS</th>
<th>STIMULANTS</th>
<th>HALLUCINOGENS</th>
<th>CONVULSANTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACIDS</td>
<td>DRUGS GIVEN TO RELIEVE PAIN OR INDUCE SLEEP:</td>
<td>DRUGS USED TO INDUCE SLEEP, FATIGUE AND APATITE:</td>
<td>MIND AFFECTING DRUGS: LSD, 'MDM', 'MDA', 'GRASS':</td>
<td>BELLADONNA STRYCHNINE, CHAMPS:</td>
</tr>
<tr>
<td>HYDROCHLORIC, SULFURIC, NITRIC, DIOXALIC, CARBOLIC</td>
<td>- DRUG, HERON, MORPHINE</td>
<td>- AMPHETAMINES</td>
<td>- HALLUCINOGENS:</td>
<td>- RAPID ACTING</td>
</tr>
<tr>
<td>AMALGAMES</td>
<td>PAREIDOLIC, SLEEPING PILLS/ CAPSULES</td>
<td>SILENCE, SNIFFLE, SLOW</td>
<td></td>
<td>- BREATH SMELLS OF BITTER ALMONDS</td>
</tr>
<tr>
<td>PETROLEUM</td>
<td>SLANG</td>
<td>PEP FILLS, BRENIES, SPEED, UMPERS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GASOLINE, KEROSENE, TURPENTINE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTHER VOLATILE LIQUIDS</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

SYMPTOMS

| LIPS AND MOUTH STAINED | SEVERE PAIN IN NOSE, THROAT, AND STOMACH | USUALLY INTENSE THIRST | SHOCK |
| LIPS AND MOUTH STAINED | METALLIC TASTE IN MOUTH | SEVERE PAIN IN STOMACH FOLLOWED BY NAUSEA AND VOMITING |

| WEAKNESS, DROWSINESS | FACE PALE OR BLUE | SKIN COLD | PUPILS CONTRACTED AND DO NOT REACT TO LIGHT | POLES: RESPIRATIONS AND ELOUT THEN RAPID AND GLYX | RESPIRATION HALLLOW AND IRREGULAR | |
| INCREASED HEART RATE AND BLOOD PRESSURE | RAPID BREATTHING | ILITATED PUPILS | MENTALLY DISORGANIZED | EMOTIONALLY DULL | |
| SEVERE HALLUCINATIONS | INCOHERENT SPEECH | LAUGHING, CRYING | HOMICIDAL OR SUICIDAL TENDENCIES | IRREGULAR BREATHING | |
| SLEEPINESS OR TALKATIVE/HALLUCINOUS | ENLARGED PUPILS | LACK OF COORDINATION | | | |

7-3
# POISONS - DRUG ABUSE

Victim may present either:

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mental Disturbance</strong></td>
<td><strong>Convulsions</strong></td>
<td><strong>Respiration Problems</strong></td>
<td><strong>Stomach Distress</strong></td>
</tr>
<tr>
<td>Mental reactions can be from apathetic to manic or self destruction</td>
<td>Insert padded tongue blade between teeth</td>
<td>Repressant and stimulant drug overdoses can cause respiration difficulties</td>
<td>Stomach pains and cramps</td>
</tr>
<tr>
<td>If victim violent:</td>
<td>Maintain airway</td>
<td>Maintain open air-passage</td>
<td>Nausea</td>
</tr>
<tr>
<td>Call police for assistance if victim considered capable of harming self or others</td>
<td>Prevent victim from injuring himself - guide his motions</td>
<td>Administer O₂</td>
<td>Vomiting</td>
</tr>
<tr>
<td>Utilize bystanders to assist in restraint if no weapons involved</td>
<td>Call police for assistance in restraining victim</td>
<td>If breathing stops - begin resuscitation</td>
<td></td>
</tr>
<tr>
<td>Do not leave scene until police arrive and assess situation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## Recommended Procedures

Make observations and report:
- Presence of burns about mouth
- Odors on breath
- Presence of vomitus and other discharge matter (return sample to hospital)
- Condition of skin (needle marks etc.)
- Peculiarities of speech
- Size of pupils
- Vital signs

1. Try to establish what victim has ingested, inhaled, or administered if possible, obtain sample of container and substance and return to hospital
2. Is "ingested" substance corrosive? (i.e., acids, alkalies, petroleum products or other volatile liquids)

```
1. If yes:
   - Do not induce vomiting
   - Transport to hospital
```

```
2. If no:
   - Induce vomiting (activated charcoal or syrup of ipecac)
   - Retain vomitus sample (return to hospital)
```

```
3. If don't know:
   - Transport to hospital
```

Enroute to hospital:
- Monitor and maintain vital signs
- Install EKG
- Install IV, if directed
- Take blood sample and deliver to hospital

---

7-4
BASIC APPROACH TO PSYCHIATRIC VICTIMS

• TAKE YOUR TIME.
• EVALUATE WHAT HAS AND IS HAPPENING.
• RESTRRAIN YOUR OWN EMOTIONS AND REMAIN CALM.
• BE HONEST.
• DO NOT USE FORCE UNLESS RESTRAINT IS ABSOLUTELY NECESSARY.
• TRANSPORT VICTIM TO HOSPITAL IN THE MOST APPROPRIATE MANNER POSSIBLE. (I.E. - FAMILY CAR WITH FAMILY MEMBERS TAKING VICTIM, POLICE CAR, OR AMBULANCE.)

PANIC

SYMPTOMS OF PANIC VICTIM:
• MAY ATTEMPT TO FLEE SCENE
• MAY LOSE ALL JUDGEMENT
• MAY WEEP UNCONTROLLABLY
• MAY WANT TO DO UNREASONABLE THINGS

HANDLING OF VICTIM IN PANIC:
• BE FIRM BUT GENTLE
• ISOLATE VICTIM IF HE MAY ENDANGER OTHERS OR CAUSE OTHERS TO PANIC (THIS MAY REQUIRE SUPPORT OF POLICE OR BYSTANDERS).
• CALL ANOTHER AMBULANCE OR POLICE CAR TO TAKE DISTURBED VICTIM TO HOSPITAL IF INJURED VICTIMS ARE TO BE TRANSPORTED IN YOUR VEHICLE.
• NEVER STRIKE A VICTIM WHO IS IN PANIC.

HYSTERIA OR VIOLENCE

SYMPTOMS OF HYSTERIA:
• ANXIOUS
• FEARFUL
• COMPLAINS OF ILLNESS AND/OR PAINS
• PARALYSIS (EXTREME CASES)
• HEADACHE
• DIZZINESS
• IRRITABILITY
• TREMORS
• SWEATING
HANDLING OF HYSTERICAL OR VIOLENT VICTIM:

- Reassure and attempt to calm victim.
- Take precautions to prevent harm to EMT crewmen or the victim. Approach in numbers at the onset, restrain victim and transport to hospital. Obtain police support if required, particularly where weapons are involved.
- Always have female accompany any female victim.
- If restraint is required for transport, get permission from:
  1. Police,
  2. Base physician, or
  3. Family member
in that order of priority.

DEPRESSION

SYMPTOMS OF DEPRESSED REACTIONS:

- Withdrawal
- Victim appears unaware of surroundings and situation
- Vacant expression without emotion
- "Anxious" facial expression
- May be crying

HANDLING OF DEPRESSED VICTIM:

- Contact must be gentle.
- Attempt to get victim to talk.
- Neither "command" nor show pity. Show understanding but not resentment.
RECOMMENDED STOWAGE CODES FOR MODULANCE TYPE SA-138 - MODIFIED FLOOR PLAN "C"
<table>
<thead>
<tr>
<th>RECOMMENDED LOC.</th>
<th>QTY.</th>
<th>ITEM</th>
<th>RECOMMENDED LOC.</th>
<th>QTY.</th>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>LT2 &amp; LM8</td>
<td></td>
<td>ADHESIVE TAPE:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1/2 Inch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>One Inch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>One Half Inch</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LT2 &amp; LT2</td>
<td>2</td>
<td>AIRWAYS:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adult</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Child</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Infant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>L13</td>
<td>1</td>
<td>AIRWAYS, RESUSCI-TUBE:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Adult</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pediatric</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LM1</td>
<td>1</td>
<td>ALCOHOL</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LM1</td>
<td>1</td>
<td>ASPIRATOR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LT5</td>
<td>4</td>
<td>COMPRESS, TRAUMA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC2</td>
<td>12</td>
<td>DEFIB JELLY, TRAUMA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>DEFIB PADS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>DISINFECTANT, SPRAY</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>DISTILLED WATER</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>DRESSES:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Carlisle</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 boxes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FR4</td>
<td>2</td>
<td>DRUGS:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Adrenaline</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Atropine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>50% Dextrose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Isuprel, 5 mg.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Isuprel, 0.2 mg.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Lidocaine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>Nitroglycerin</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>Sodium Bicarbonate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>Valium</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EKG TAPE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Eye Packs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Foilage Spray</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Electrodes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gloves, Sterile</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IV Packs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vosents</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IV FLUIDS:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>DSW</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Ringers Lactate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sodium Chloride, 9%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LINENS:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Blanket</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pillow</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sheets, Disposable</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MANOMETER, ANEROID</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MERTHOLATE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NEEDLES:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BUTTERFLY 19</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>BUTTERFLY 23</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MEDICUT 18</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MEDICUT 20</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>NORMAL SALINE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OB KIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>O-SYL SOLUTION</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OXYGEN BOTTLE, INSTALLED</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OXYGEN BOTTLE, PORTABLE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OXYGEN FLOWMETER</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OXYGEN MASK, DISPOSABLE</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OXYGEN MASK, VALVE-INHALATOR</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>POISON KIT</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RESCUE TACHOMETER</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>RESCUE TOOLS:</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Axe, Flathead</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bolt Cutter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Crescent Wrench</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Crow Bar</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hack Saw</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Hammer, 5 lbs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Rescue Line, 50 ft.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Screwdriver, Flathead</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Screwdriver, Phillips</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Shovel</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tin Snips</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Tool Pouch</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Wrecking Bar</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Vise Grips</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>SAFETY PINS</td>
</tr>
<tr>
<td>LOC.</td>
<td>QTY.</td>
<td>ITEM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>------</td>
<td>-----------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 blt.</td>
<td>2</td>
<td><strong>SALT TABLETS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td><strong>SANITARY NAPKINS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RT1</td>
<td>1</td>
<td><strong>SCOOPE STRETCHER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC2</td>
<td>1</td>
<td><strong>SNAKEBITE KIT</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td><strong>SPLINTS:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rigid</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>Short Arm</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>Long Arm</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>Long Leg</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>- <strong>Thomas Half Ringed</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td><strong>Inflatable</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>- <strong>Full Arm</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>- <strong>Half Arm</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>- <strong>Full Leg</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>- <strong>Half Leg</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td><strong>STAIR CHAIR</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1</td>
<td><strong>STETHOSCOPE, DIAPHRAGM</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D1</td>
<td>1</td>
<td><strong>TELECARE</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LM2</td>
<td>1</td>
<td><strong>TIMER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 box</td>
<td><strong>TONGUE DEPRESSORS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LT4</td>
<td>1</td>
<td><strong>TRAUMA PACK</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>