EMS COMMUNICATIONS
Objectives

- Phases of Communication
- Role of Communications in EMS
- Basic Model of Communication
- Communication Systems
- Role of Dispatch
- Radio Communication
EMS COMMUNICATION LINKS

Sequence of EMS event
- Occurrence of event
- Detection of event
- Notification and response of emergency personnel
- Treatment and preparation of patient for transport
- Transport and delivery of patient to receiving facility
- Preparation for next event
COMMUNICATION LINKS

- Notification of EMS systems
  - 9-1-1, E 9-1-1
  - Radio report from another agency
COMMUNICATION LINKS

- Notification of response personnel
  - Direct telephone link to crews
  - Radio dispatch of crews
  - Pagers
  - Computer aided dispatch
COMMUNICATION LINKS

Intermediate to medical control
- Patient report from field to hospital
- Direct communication at hospital
  - Detailed verbal report
  - Detailed written report
COMMUNICATION LINKS

- Notification of return to service
  - Ambulance restocked, cleaned, refueled
  - Infection control procedures
Basic Communication Model

1. SENDER has a thought
2. SENDER ENCODES thought into a MESSAGE.
3. MESSAGE is Transmitted through a CHANNEL
4. RECEIVER DECODES message
5. RECEIVER INTERNALIZES message
What effects communication?

- Attributes of the receiver
  - Cultural differences
  - Language Barriers
  - Age
  - Attitude
    - Responder
    - Dispatcher
Selective Perception
- Block out other information
- Selective hearing

Semantic Problems
- Words may have different meaning
  - Comatose

Time pressure
- Message gets distorted
- Bypass normal communication channels
COMMUNICATION SYSTEMS:

- **Simple**
  - Desk top radio
  - Portable
  - Microphone and antenna

- **Complex**
  - High-power transmitters
  - Repeaters
  - Satellite Receivers
TECHNICAL ASPECTS

Base station

- Located in High spots
- Principal transmitter and receiver for system
- 45 to 275 watts set by FCC
- Multiple-channel capabilities
TECHNICAL ASPECTS

Mobile two-way radios
  - Vehicular mounted, 20 to 50 watts
  - Range can depend on terrain
  - Multiple channel capabilities
  - Biotelemetry capabilities
TECHNICAL ASPECTS

- Portable radios
  - Hand-held, 1 to 5 watts, often used with repeaters
  - Multiple channel capabilities
TECHNICAL ASPECTS

Repeater systems

- Receives weak signal and rebroadcasts at higher power
- Important for large geographical areas
- Can be vehicular mounted
TECHNICAL ASPECTS

Advantages of repeaters

- Permits communication over a large area
- Allows flexibility in areas with abnormal terrain
- Assures better communication
- Weak transmissions will be heard
TECHNICAL ASPECTS

Remote consoles

- Operation of base station from another location
- Use telephone lines or microwave links
TECHNICAL ASPECTS

Satellite receivers

- Used for large areas
- Receives weak transmissions and relays to base station
TECHNICAL ASPECTS

- Encoders and decoders
  - Encoders activate decoders by sending out specific tones over the air
  - Decoders activated by the signal
TECHNICAL ASPECTS

Mobile telephones
- Cellular technology is now cost-effective
- Capability to send biotelemetry
- Dedicated lines for the EMT-I

Digital Modes

Computers
- Data Access
- Send out information
RADIO WAVE TRANSMISSION

Amplitude modulation - AM
- Modifies radio transmission by varying the amplitude of the signal
- Poor quality, good range
RADIO WAVE TRANSMISSION

- Frequency modulation - FM
  - Modifies radio transmission by varying the frequency of the signal
  - Good quality, poor range
FREQUENCIES

Hertz (Hz)
- The number of cycles per second in a radio signal
- 1 Hz = 1 cycle per second; 1 Kilohertz (KHz) = 1,000 cycles per second
- 1 Megahertz (MHz) = 1,000,000 cycles per second
- 1 Gigahertz (GHz) = 1,000,000,000 cycles per second
- Most radio communications are 100 KHz to 3,000 GHz
FREQUENCIES

Band

- A small segment of the total frequency spectrum
- Public safety bands
  - VHF low band - 30 MHz to 50 MHz
  - VHF high band - 150 MHZ to 170 MHz
  - UHF - 450 MHz to 470 MHz
  - New - 800 MHz
FREQUENCIES

Trunking

- Computerized allocation of frequencies
- Eliminates need to find open frequency
FREQUENCIES

Med channels

- Duplex pairs designed for ALS
- Channels 1-8 for Intermediate to physician
- Channels 9-10 for EMS dispatching purposes
BIOTELEMETRY

The process of transmitting physiological data, such as ECG, over the radio

A modulator electrically translates voltage changes (ECG) into sound waves
- The telemetry radio has a modulator

A demodulator translates sound waves back into voltage changes
- The hospital base station has a demodulator
BIOTELEMETRY

Common causes of interference in biotelemetry communications

- Loose electrodes
- Muscle tremors
- 60 Hz interference and power fluctuations
- Voice over EKG
TRANSMISSION TYPES

- Simplex
  - The ability to transmit or receive only at one time
  - One frequency used
  - Most organizational communications are simplex
TRANSMISSION TYPES

- **Duplex**
  - Transmit and receive simultaneously using two separate frequencies.
  - Either party can interrupt the other during transmission.
TRANSMISSION TYPES

Multiplex

- Transmit voice and EKG simultaneously over the same frequency
- Allows the Paramedic to talk while sending an EKG strip
EMS communications equipment is fragile and expensive
Proper care and maintenance are important for long life
Avoid mishandling
Schedule regular cleaning
Have equipment repaired by a qualified technician
Keep batteries charged and spares ready
RULES AND OPERATING PROCEDURES
THE FEDERAL COMMUNICATIONS COMMISSION

- Licenses agencies and transmitters
- Allocates frequencies for use
- Establishes technical standards for hardware
- Licenses personnel
- Monitors frequencies for proper use
- Conducts site checks
The EMS dispatcher

- Obtains information
- Directs appropriate agency
- Monitors and coordinates communications
- Gives pre-arrival instructions
- Maintains written records
- Manages systems resources
RADIO CODES

- Communicate a large amount of information quickly
- Allows for confidentiality
- Ten-code system (Not so much anymore)
- Using standard Plain English
RADIO COMMUNICATION TECHNIQUES

- Listen before talking, press and wait
- Speak at close range, slowly and clearly
- Avoid emotion
- Be brief and do not waste air time
- Protect patient privacy
- Avoid slang, profanity, use standard formats
- Repeat all orders, confirm message received
- Write down specific information
COMMUNICATION OF MEDICAL INFORMATION
VERBAL COMMUNICATION OF PATIENT INFORMATION

- Agency, unit designation, Intermediate name, and level of certification
- Scene description/mechanism of injury
- Patient’s age, sex, and weight
- Chief complaint
- Primary problem
- Associated symptoms
- Brief history of present illness
VERBAL COMMUNICATION OF PATIENT INFORMATION

- Past medical history
- Vital signs; level of consciousness; general appearance; glucose testing; any pertinent physical exam findings
- Treatment rendered and request for further treatment
- ETA
- Private physician’s name
GUIDELINES/COMMUNICATING WITH MED CONTROL PHYSICIAN

- Give an accurate and complete report
- Provide whatever information requested by physician
- Repeat orders and question unclear orders
- Report back and keep physician informed
- Protect patient privacy
- Consult and seek advice in unusual situations
WRITTEN COMMUNICATIONS

- Record patient’s initial condition and care
- Becomes legal record of pre-hospital care
- Information for billing, chart audits
- Document patient’s refusal of care
- Defense against malpractice